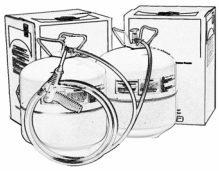
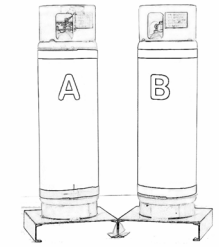
TECHNICAL DATA SHEET

Two-Component Pour-in-Place Foam System





Handi-Flow® Pour-in-Place foam systems are multiple purpose two-component polyurethane froth foams designed within the international guidelines for protection of the ozone layer, and with respect to the Montreal Protocol, 1987, and other environmental guidelines, utilizing a non-flammable non-ozone depleting blowing agent to assist in the safety of the end user and the environment. The pre-pressurized, portable two-component froth foam systems are dispensed through the state-of-the-art Handi-Gun® two-component dispensing unit. The product designation of "Pour-in-Place" refers to the slower curing, more "pour-able" properties of this froth foam system. Compared to traditional "quick-cure" two-component spray foam products, these properties provide mold filling application advantages.

Application Area
Handi-Flow Pour-in-Place foams are specifically designed for filling cavities, molds, fixtures or holes where a slower curing and expanding polyurethane foam system is required. The foam can be dispensed into clean and dry voids of various size to insulate, fill, seal, strengthen, provide buoyancy, deaden sound and reduce vibration. The Handi-Flow Slow Rise (SR) systems meet the Coast Guard specification requirements for flotation in Title 33 code of Federal Regulations, paragraph 183.114. The Handi-Flow Cavity Fill systems are predominately used in OEM or other "in-plant" applications, where more engineering controls are needed for optimum performance.

Properties
Handi-Flow Pour-in-Place foam systems expand and cure slowly over the first several minutes after being dispensed (see Technical Data section for cure times) to a semi-rigid closed cell foam upon the chemical reaction of component A (a polymeric isocyanate) with component B (a polyol blend containing certain additives). This slow expansion process allows the foam to fill completely into corners and void spaces to create a seamless, continuous insulation. The final expanded volume will be 3 to 5 times the dispensed volume in specific applications depending on various factors such as cavity size and ambient conditions.

Handi-Flow Pour-in-Place foams adhere to almost all building materials, with the exception of surfaces such as polyethylene, Teflon®, silicone, oils and greases, mold release agents, and similar materials. Cured foam is resistant to heat and cold, -200 to +200°F (–129 to +93°C), and to aging, but not UV rays (i.e. sunlight) unless painted, covered or coated. Cured PU foam is chemically inert and non-reactive in approved applications, and will not harm electrical wire insulations, Romex®, rubber, PVC, polyethylene (i.e. PEX) or other plastic. It is approved for use around wires, plumbing penetrations, drywall, etc., and contains no formaldehyde.

Handi-Flow Pour-in-Place systems are available in various refillable and non-refillable sizes to meet specific job application requirements.

Preparation For Use
Protect surfaces not to be foamed. For pouring or mold filling applications, clamping or bracing of the mold is generally required to provide uniform support against foaming pressure. Extent of this clamping should be determined based on application and desired results. For best results, it is advantageous to heat the mold substrate to 80 - 100°F (27 - 37°C), as this will improve both the adhesion and the "flowability" (filling characteristics) of the dispensed froth foam.

Optimum chemical temperature is 75 - 85 °F (24 - 29°C). See the "Product Storage" section for important temperature information.

Application/Use
Pour-in-Place foam should be filled into cavities in excess of the theoretical "free-rise" volume. This is important in order that the foam is "packed" to a higher in-place density, thereby achieving optimum physical properties and dimensional stability. A calculated in-place density of 2.0 lb./ft.³ (32 kg/m³) is recommended and shown for specification purposes.

Mold pressure is difficult to predict, however, there will be mold pressure exerted by any Pour-in-Place foam in nearly all applications. Therefore, all molds need to be clamped or braced in some way.

The amount (or weight) of foam needed to fill a particular cavity is often referred to as the "shot time". This can be roughly estimated by first knowing the volume of the cavity (cavity size), and the desired in-place density of the foam (use 2.0 lb./ft.³ as a starting point, if the final actual in-place density is unknown). The following calculation shows how this information can be used to determine the approximate weight of foam needed;

Amount (weight) of foam needed in pounds = cavity size (ft.³) X desired density (lb./ft.³)

The actual shot time will also depend on other factors such as chemical temperature, application temperature, amount of chemical remaining in the system, etc., and should be determined by trial application. The major difference between refillable and non-refillable systems is that the output rate of the refill systems is constant if the Handi-Gun is kept at the same trigger meter, as opposed to the output rate of the non-refillable kits, which decreases steadily as the product is emptied.

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Technical Data

Free Rise Density = 1.75 lb./ft³ (28 kg/m³) ASTM D-1622	Handi-Flow Slow Rise (SR)	Handi-Flow Cavity Fill
IN PLACE DENSITY	2.0* lb./ft³ (32 kg/m³)	2.0* lb./ft³ (32 kg/m³)
K-FACTOR ASTM C-518 (28 day aged)	0.168 BTU·inch/(ft²)(hr)(°F) (.024 W/m·K)	0.179 BTU·inch/(ft²)(hr)(°F) (.026 W/m·K)
R-VALUE	5.9/inch (RSI=1.04/inch, 0.41/cm)	5.6/inch (RSI=0.99/inch, 0.39/cm)
TENSILE STRENGTH ASTM D-1623		
Parallel	42 psi (290 kPa)	13 psi (90 kPa)
Perpendicular	28 psi (193 kPa)	23 psi (159 kPa)
COMPRESSIVE STRENGTH, ASTM D-1621		
Parallel @ 10%	14 psi (97 kPa)	12.5 psi (86 kPa)
Perpendicular @ 10%	15 psi (103 kPa)	12 psi (83 kPa)
DIMENSIONAL STABILITY ASTM D-2126		
Heat Age (+ 158 °F/ 70°C; 28 days)	-4.5%	+0.69%
Humid Age (+158°F/ 70°C; 100% RH)	-1.0%	+2.01%
Cold Age (-4°F/ -20°C)	-0.3%	-1.88%
CLOSED CELL CONTENT ASTM D-2856	Approx. 90%	Approx. 90%
TACK-FREE / EXPANSION TIME	60-90 sec.	120-240 sec.
CUTTABLE	5-10 min.	10-20 min.
FULL CURE	1 hour	1 hour

Approvals / Standards

Handi-Foam Slow Rise (SR) systems meet the Coast Guard specification requirements for flotation in Title 33 code of Federal Regulations, paragraph 183.114 and meet the requirements of DIN 4102-1 for a "B2" building material.
Dispensing unit is patented under U.S. patent number 6,345,776. Other foreign and domestic patents may be pending.
ODP (Ozone Depletion Potential): Contains non-ozone depleting, non-flammable HFC propellant.

Theoretical Yield*

	2.0 PCF IN-PLACE*
NON-REFILLABLE HANDI-FLOW SLOW RISE (SR)	
2-7 HANDI-FLOW SR P10709	7.6 ft³ (0.22 m³)
2-13 HANDI-FLOW SR P10732	13 ft³ (0.37 m³)
2-43 HANDI-FLOW SR P10760	43 ft³ (1.24 m³)
NON-REFILLABLE HANDI-FLOW CAVITY FILL	
2-14 HANDI-FLOW CAVITY FILL P10742	14 ft³ (0.39 m³)
2-44 HANDI-FLOW CAVITY FILL P10766	44 ft³ (1.24 m³)
REFILLABLE SYSTEMS (SR AND CAVITY FILL)	
SYSTEM 17 HANDI-FLOW P22045 (SR) AND P22054 (CF)	128 ft³ (3.6 m³)
SYSTEM 27 HANDI-FLOW P22245 (SR) AND P22254 (CF)	213 ft³ (6.0 m³)
SYSTEM 60 HANDI-FLOW P22445 (SR) AND P22454 (CF)	458 ft³ (13.0 m³)
SYSTEM 100 HANDI-FLOW P22645 (SR) AND P22654 (CF)	787 ft³ (22.3 m³)

*Yields are based on theoretical calculations, for comparative purposes. Physical properties and yields are based on an in-place density of 2.0 lb./ft³. Actual yields will vary depending on in-place density, application, and ambient conditions. Consult technical information for recommended application procedures. For non-refillable kits, the model number after the dash (-) reflects the theoretical yield in cubic feet. For example, 2-13 yields approximately 13 cubic feet of cured foam.

Tank Specifications (Per Tank)

	Systems 17 and 27	Systems 60 and 100
Dimensions		
Height	54" (137 cm)	61" (155 cm)
Diameter	15" (38 cm)	30" (76 cm)
Base	20" x 20" (51 cm x 51 cm)	30" x 30" (76 cm x 76 cm)
Empty Weight	121 lbs. (55 kg)	360 lbs. (163 kg)
Filled Weight[1]	System 17: 265 lbs. (120 kg) System 27: 350 lbs. (159 kg)	System 60: 860 lbs. (390 kg) System 100: 1190 lbs. (540 kg)

[1]Filled tank weights are approximate for estimation purposes only. Actual gross weight is formulation specific and may be slightly higher or lower, depending on system and component.

Refill systems have a constant and stable pressure exerted by the external nitrogen cylinder as the tanks are emptied. The non-refillable kits are pre-pressurized during manufacture, and therefore the nitrogen pressure that is used to propel the contents steadily decreases during use. Use of a scale to measure the weight of dispensed foam is recommended in all applications.

Product Storage

Store in cool dry area. Do not expose to open flame or temperatures above 120°F (49°C). Excessive heat can cause premature aging of components resulting in a shorter shelf life. Handi-Flow Pour-in-Place foams are reusable by following product instructions. For optimum results, chemical temperature must be between 75-85°F (24-29°C). During colder months it may take up to a week or more to warm the chemicals to optimum temperature, depending on chemical tank size. Construction of a temperature controlled "hot box" is recommended for all refill applications in order to store the systems at a consistent, controlled temperature prior to and during use.

Important Note:

Use only in well ventilated areas or with NIOSH certified respiratory protection. Wear impervious gloves, protective eyewear and suitable work clothes. Read all instructions and safety information (MSDS) prior to use of any product. The product contains no formaldehyde. Cured foam is non-toxic.

KEEP OUT OF REACH OF CHILDREN.

Always read all operating, application and safety instructions before using any products from Fomo Products, Inc. Use in conformance with all local, state and federal regulations and safety requirements. Failure to strictly adhere to any recommended procedures and reasonable safety precautions shall release Fomo Products of all liability with respect to the materials or the use thereof. For additional information and location of your nearest distributor, call Fomo Products, Inc. 1 330.753.4585 or 1 800.321.5585.

NOTE: Physical properties shown are typical and are to serve only as a guide for engineering design. Results are obtained from specimens under ideal laboratory conditions and may vary upon use, temperature and ambient conditions. Right to change physical properties as a result of technical progress is reserved. This information supersedes all previously published data. Yields shown are based on theoretical calculations and will vary depending on ambient conditions and particular application. Read all product directions and safety information before use. Consult local building codes for specific requirements regarding the use of cellular plastics or urethane products in construction.

WARNINGS: Follow safety precautions and wear gloves and other protective equipment as recommended. Consult Material Safety Data Sheet (MSDS) for specific information. Prolonged inhalation exposure may cause respiratory irritation/sensitization and/or reduce pulmonary function in susceptible individuals. Onset may be delayed. Pre-existing respiratory conditions may be aggravated. Use only with adequate ventilation or certified respiratory protection. NIOSH approved positive pressure supplied air respirator is recommended if exposure guidelines may be exceeded. Contents may be very sticky and irritating to skin and eyes, therefore wear protective eyewear, impervious gloves and suitable clothing when operating. If liquid chemical comes in contact with skin, first wipe thoroughly with dry cloth, then rinse affected area with water. Wash with soap and water afterwards, and apply hand lotion if desired. If liquid comes in contact with eyes, immediately flush with large volume of clean water for at least 15 minutes and get medical help at once. If liquid is swallowed, get immediate medical attention. Products manufactured or produced from these chemicals are organic and, therefore, combustible. Each user of any product should carefully determine whether there is a potential fire hazard associated with such product in a specific usage. **KEEP OUT OF REACH OF CHILDREN.**

LIMITED WARRANTY: The Manufacturer warrants only that the product shall meet its specifications: THIS WARRANTY IS IN LIEU OF ALL WRITTEN OR UNWRITTEN, EXPRESSED OR IMPLIED WARRANTIES AND THE MANUFACTURER EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. The buyer assumes all risks whatsoever as to the use of the material. Buyer's exclusive remedy as to any breach of warranty, negligence or other claim shall be limited to the replacement of the material. Failure to strictly adhere to any recommended procedures shall release The Manufacturer of all liability with respect to the materials or the use thereof. User of this product must determine suitability for any particular purpose, including, but not limited to, structural requirements, performance specifications and application requirements.

HANDI FLOW®

Two-Component Pour-in-Place Foam Systems

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