

Chapter 1 INTRODUCTION

1.1 Introduction

This manual introduces builders, contractors, architects and engineers to the design parameters and potential applications of SmartBlock™ insulating forms.

SmartBlock insulating forms are expanded polystyrene (EPS) forms for pouring concrete load-bearing, shear and foundation walls. The forms are left in place after concrete is poured and provide superior insulation relative to conventional wood, concrete and masonry walls.

The units are manufactured in two basic types, Standard Forms (SF10 Series) and Variable Width Forms (VWF Series). Both forms have rows of interlocking teeth at the top and bottom to facilitate easy assembly. The form units remain after placing of reinforcing steel and concrete and must be protected by approved interior and exterior finish materials.

The SF10 Series units are 10 inches high by 10 inches wide by 40 inches long. The face shell thickness of the SF10 Series is 1¾inches. When assembled, the units form 7½inch by 6½inch rectangular vertical cores at 10 inches on center and 6½inch by 6¼ inch rectangular horizontal cores at 10 inches on center.

The VWF Series units are 12 inches high by 40 inches long and can be assembled in varying widths providing concrete walls of 3¾inches, 5¾inches, 7¾inches, 9¾inches, and other custom made widths. The average face shell thickness of the VWF Series is 2.125". The facing walls of the form are interconnected with eight plastic bridge inserts.

SmartBlock insulating forms are molded from EPS beads manufactured by BASF Corporation (ICBO Evaluation Report No. 3401) or Huntsman Chemical Corporation (NER-348), having a density of 1.5 to 2.0 pounds per cubic foot with a maximum flame-spread rating and smoke-

density of 10# and 250# respectively, in accordance with the 1991 Uniform Building Code (UBC) Standard No. 42-1.

SmartBlock insulating forms are recognized by ICBO ES (Evaluation Report No. 4572), BOCA ES (Research Report No. 95-46), State of New York DHCR (Certificate No. 624-93-MC), State of Wisconsin DILHR (Approval No. 980020-I) and the City of Los Angeles (Research Report No. 25006).

All users of SmartBlock insulating forms should refer to the enclosed copies of evaluation reports and reports released after publication of this manual. These reports contain revised conditions related to the use of SmartBlock insulating forms and should be kept current by all users of the product. Updates will be provided by the manufacturer on request, but use of SmartBlock insulating forms must be coordinated with local building officials.

The design concepts within this manual use industry standards for most typical applications. Trade and material associations have been consulted to verify the workability of the product and to ensure that these assemblies address general field conditions. Since specifics vary depending on local conditions, it is imperative that all details, specifications and calculations be reviewed by the individual project architect or engineer. Structural designs and calculations are based upon normal allowable forces and loads, and tables are included to show a variety of applications for SmartBlock insulating forms. Due to varying load conditions and building codes, each project should be reviewed and approved by the project architect or engineer.

1.2 What Is Expanded Polystyrene (EPS)?

The use of EPS as formwork for concrete has a history in Europe dating back approximately 35 years. The use of EPS as formwork evolved from its use as an insulating material in construction.

There are two common types of polystyrene foam, extruded polystyrene (popularly known by its Dow trademark Styrofoam) and expanded polystyrene or EPS. Most food service applications including meat trays, egg cartons, hamburger clam shells, foam plates and trays are extruded polystyrene, as are most types of loose-fill packaging. However, the common coffee cup is made of EPS. Almost all industrial cushion packaging - the cellular white molded foam that is used to package televisions, stereos, computers and delicate electronic equipment, as well as other fragile industrial and consumer products - is also of EPS, as are most bicycle helmets. Both EPS and extruded polystyrene are used extensively as thermal insulation in industrial, commercial and residential construction.

As a raw material, EPS is produced in the form of white granules ranging in size from 8/1000ths to 12/1000ths of an inch. These granules, commonly referred to as bead or resin, feel something like very fine, polished sand. Three processing stages - prefoaming, intermediate storage and final foaming - turn the bead into rigid foamed plastic shapes, which in this case are SmartBlock insulating form units.

Unlike extruded polystyrene, EPS contains no chlorofluorocarbons (CFC's). EPS is inert and is less toxic than wood when burned. The EPS used in SmartBlock insulating forms contains fire resistant additives which do not allow it to sustain a flame.