

# Technical Case Study

## Adding Value Through BASF's Building Science Experts



A local homebuilder looking to increase home performance and differentiate itself in the market collaborated with the experts at the BASF Center for Building Excellence. The company was able to incorporate advanced construction techniques, revolutionary product innovations and cost-shifting strategies to improve its HERS® scores and affordably build a more durable, energy-efficient home.

### LOCATION

U.S. Climate Zone 6

### DESCRIPTION

- 2,400-square-foot, two-story construction over a basement
- High-performance builder wanted to finetune current practice and consider adoption of new, advanced systems

### CODE REQUIREMENTS

- 2009 IRC code equivalent
- 2006 IECC code equivalent
- Recent increase in stringency for braced wall standards in state code

### TECHNOLOGY FOR IMPROVEMENTS

- Incorporated the HP+™ Wall System
- Reduced heating and cooling load
- Improved HERS index
- Reduced lumber
- Reduced infiltration

**BASF**

We create chemistry

# Collaborative Construction

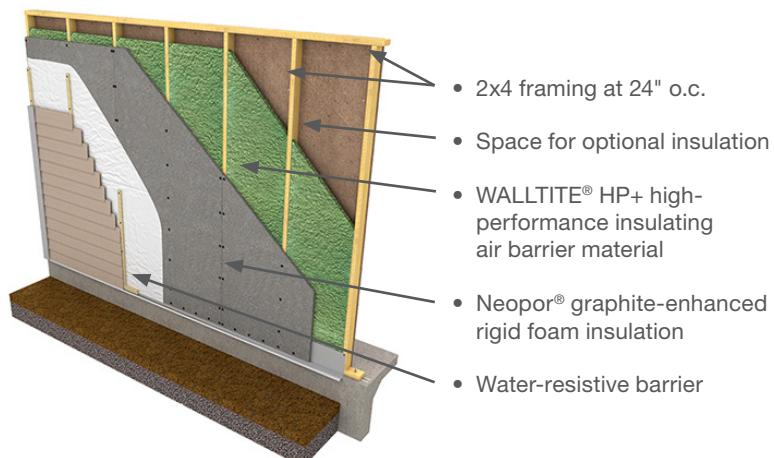
As part of the BASF innovative HP+™ Consultative Solutions, BASF put its team of building scientists, architects, engineers and sustainable construction experts from the BASF Center for Building Excellence to work on the project. Bringing an array of multi-disciplinary skillsets to the table, BASF's experts collaborated with the builder's team to look at the home's design and construction holistically, reducing lumber and heating costs, lowering HERS® scores and reducing the heating load.

## Improving Performance

A cornerstone of the plan was the builder's adoption of BASF's HP+ Wall System, a breakout construction solution that aggressively addresses thermal, air and moisture control and provides structural strength with fewer framing members, allowing the builder to downsize the mechanicals installed in the home.

By implementing the wall system into the plan, the builder was also able to utilize many advanced framing techniques on the project, including:

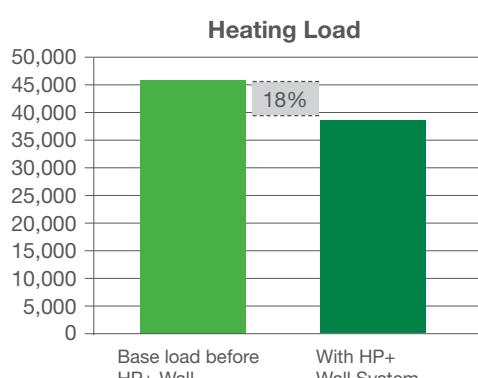
- Removing redundant jack and cripple studs
- Installing right-sized, insulated box headers
- Placing ladder framing at interior wall intersections
- Aligning load path



## Increasing Efficiency. Improving Scores.

### Reduced Heating and Cooling Load

By implementing the consultative solutions approach and HP+ Wall System, the home's heating load was reduced by 18% translating to a direct savings for the homeowner through lower heating usage.



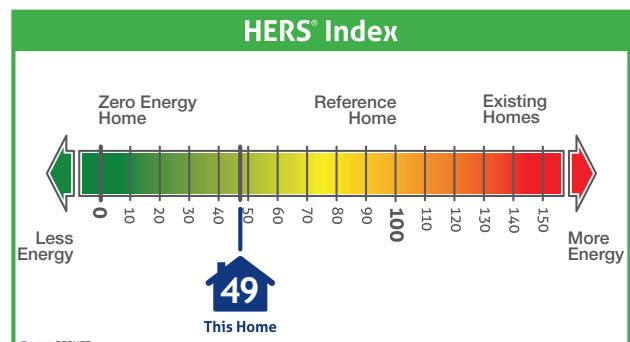
A typical builder using R-19 cavity insulation in 2x6 framing has an effective R-value of 11.8. The HP+ System with continuous insulation, closed cell spray foam and 2x4 advanced framing boosts the effective R to 15.3.

### Operating Heating and Cooling Costs

Adoption of the HP+ Wall System led to a 4% reduction in the heating and cooling operating costs; the consultative solutions process further reduced energy usage by 20% through the adoption of an efficient lighting package and duct testing.

### Improved HERS Scores

The installation of the HP+ Wall System also helped the builder's HERS index scores, moving from a 62 score to a 59. The builder incorporated (installed) an efficient lighting package, adopted duct testing and added foundation insulation to further reduce the HERS score to 49.



### Reduced Lumber

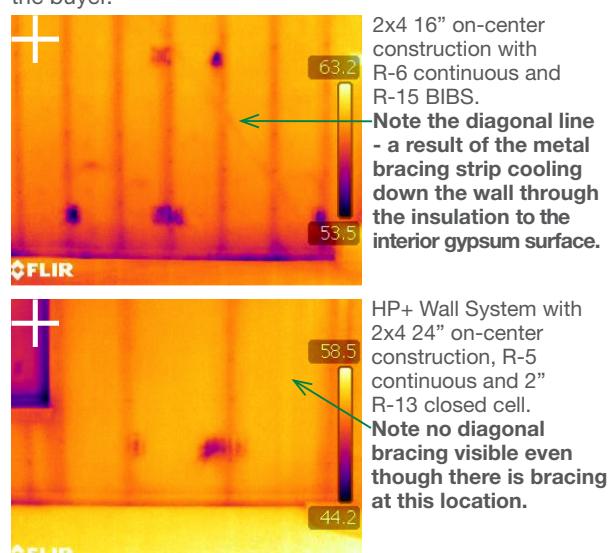
Compared to its previous practices, the builder is now using almost 36% less wood. Compared to other builders in the area who build with 2x6 walls and do not practice any advanced framing, this builder is using 56% less wood. Even when builders reduce the lumber used, they can realize up to a 30% increase in strength, although plan configuration will modify that number.<sup>1</sup>

### Reduced Air Infiltration

Even though base infiltration rates were low at 2.9 ACH50, the HP+ Wall System reduced infiltration to 2 ACH50. Further improvement is expected with the next build.

### Result

Reduced HERS scores, improved heating and cooling loads, reduced operating costs and less lumber = an affordable solution to constructing a home that is more durable, more comfortable and more energy efficient for the buyer.



1. HP+ Wall System calculations are based on AWC Special Design Provisions - Wind and Seismic (SDPWS), Section 4.3; equations were derived from ASTM E2126 testing. OSB wall calculations are based on AWC Special Design Provisions - Wind and Seismic (SDPWS), Section 4.3. Results may vary depending on wall configuration.