

HOUSEPLANSDIRECT TECHNICAL GUIDES

SIPs ROOFS EXPLAINED

A complete guide to structural insulated panel roof construction



Pitched structural insulated panel roof with its structure, insulation and principal junctions exposed.

NINE-PART PUBLICATION EDITION

Principles · Systems · Structure · Anatomy · Erection · Moisture · Fire · Inspection

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About this guide

This guide explains structural insulated panel (SIP) roofs for low-rise housing in England. It is intended for clients, designers and site teams who need to understand system selection, structural action, thermal and moisture performance, panel schedules, erection, airtightness, roof coverings, services, fire protection and inspection. Proprietary system information, structural calculations, certified build-ups and Building Control requirements always take precedence.

SCOPE SIP roofs are proprietary structural envelope systems. Panels, joints, supports, openings, temporary works, moisture control, coverings and linings require coordinated project information. Figures are explanatory and must not be scaled.

Part 1 – Introduction: What Is a SIP Roof?

Factory-made structural panels forming an insulated roof deck

A SIP commonly combines structural timber-based facings with a rigid insulation core bonded between them. Panels span between designed supports and are joined with splines, plates and fixings to form a continuous roof deck. The complete roof also needs bearings, restraint, weathering, airtightness, vapour control, fire linings and junction details suited to the selected proprietary system.



Figure 1 — Typical pitched SIP roof construction and principal junctions.

1.1 Principal components

Component	Primary role
Panel facings	Carry in-plane stresses and provide structural skins.
Insulation core	Separates and stabilises facings while limiting heat flow.
Splines and joints	Transfer forces and continue thermal and air-control layers.
Supports and fixings	Provide bearing, restraint, uplift resistance and diaphragm connections.
Coverings and linings	Provide weather, fire, acoustic and decorative performance.

1.2 Benefits and limitations

- Large insulated panels can enclose a simple roof form rapidly with relatively few repeating joints.
- Continuous insulation and carefully sealed splines can support low U-values and robust airtightness.
- The roof can create usable warm-volume accommodation without deep conventional rafter zones.
- Panels are system-specific and moisture-sensitive: openings, bearings, splines, lifting and temporary stability require coordinated specialist design.

KEY PRINCIPLE A straight insulated panel does not prove a sound roof. Performance depends on bonded composite action, verified bearings and joints, dry construction and continuous weather, air, vapour and fire-control layers.