Selection guide 5 min read By the Sarda Magnets engineering team

Permanent, electro or electro-permanent: how to choose a lifting magnet

How the three lifting technologies compare, and how to derate a magnet for thin or long plate.

Three kinds of magnet can lift steel. They differ in how they switch, what happens if the power fails, and how large they can be built. Choosing between them, and then sizing for the plate you actually lift, is what keeps a lift safe.

The three technologies

	Permanent	Electro	Electro-permanent
Switching	By hand, on the magnet	Remote	Remote
Power	None	Continuous while holding	A pulse of about 2 seconds to switch on, and again to switch off
If power fails	Not affected	Load drops unless battery backup works	Load stays held
Size	e-LIFT range up to 5000 kg	Any size	Any size
Limits	Operator must reach the magnet	Heats in continuous use; coil failure drops the load	Not for high air gaps or scrap

Electro magnets are the only choice for scrap and large air gaps (see MAGNALIFT - HD). For plates, blocks and billets on a crane, electro-permanent systems such as EPM-FB give remote control without depending on power to hold the load.

Derate for plate thickness

Rated capacity assumes a solid, flat plate more than 50 mm thick, of at most 2000 × 2000 mm. Thinner plate carries less flux, so the magnet lifts less:

Plate thickness	Usable capacity
More than 50 mm	100%
25 mm	60%

Plate as supplied by a major steel plant is usually flat and smooth enough. Always hang the magnet from the centre of the load so it lifts in balance.

Long or thin plates: use more magnets

> **Keep overhang to 1000 mm or less**, and only on plate over 25 mm thick that does not bend when lifted.

When plate is thin and longer than 2000 mm, use several lower-capacity magnets on a spreader beam rather than one large magnet, keeping overhang within 800 mm across the width and 1000 mm along the length.

Worked example: a plate of 6000 × 2000 × 12 mm needs at least four sets of magnets (two magnets per set, side by side) hung from a 4000 × 1000 mm spreader beam.

For yards handling many plate sizes, Sarda builds telescopic plate handling systems: a spreader beam with two fixed sets of magnets and two sets that move between 800 and 1100 mm.