PalletLink Datasheet

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International strength quality levels for pallet and case nails

Since 2002 there have been internationally accepted levels for the bending strength of wood pallet and packaging nails. The relevant standard is EN ISO 15629: 2002: *Pallets for materials handling - Quality of fasteners for assembly of new and repair of used wooden flat pallets.* This has also been published unchanged as a BS (British Standard) – BS EN ISO 15629

There are three ISO levels for heavy duty (annular ring and plain) nails and three lower levels for light duty plain nails (such as used for clinched *pallet mat* fasteners). The unit used for nail bending strength in EN ISO 15629 is Newton-metres (shortened to Nm).

Above 6.0 Nm – is designated -	HIGH strength
Above 5.4 Nm	MEDIUM strength
Above 4.5 Nm	LOW strength

These minimum values given by ISO do not relate to nail diameter, they apply to whatever nail diameter will achieve the required bending strength. In other words poor quality steel may need a 3.5mm diameter to achieve HIGH strength and a better quality steel may only need a 3.3mm nail to achieve HIGH strength.

Extensive PalletLink tests on a range of commercial ring nails show that about 10% of European nails of 3.35mm diameter reached the HIGH strength level. Some 50% reached MEDIUM level and the balance comfortably reached LOW. This suggests that the ISO levels are a practical requirement and enable pallet and casemakers to choose appropriately. Certain heavily stressed products, such as one tonne potato boxes and full perimeter 1500 kg pallets for use in beam racking, need the HIGH strength.

As a practical comparison for use in pallet production, the level at which a poor quality 3.35mm diameter nail might cause bending problems (cripple) when nailing into dense softwood (such as French maritime pine) is below the 5.4 Nm bending strength level, ie. avoid LOW (ISO) strength nails when nailing dense timbers with 3.35mm nails. (Crippling during production nailing is a complex area, seek advice if in doubt).

These ISO 15629 strength values are measured using test method ISO 12777-1: 1997: *Determination of bending resistance of pallet nails*. (Nail testing is a free service for PalletLink members).

Note that certain commercial specifications such as EUR (Europallets) and CP (Chemical Pallets) and some North American pallet specifications do not use this bending strength quality control method. In fact all three use a different method entirely, ie. UIC 435-2, N/mm² and MIBANT methods respectively.

In the illustration above the nail on the right is shown after strength testing using MIBANT method, which is a well established older method of measuring nail strength developed in the USA and useful where plain and helical nails are used. The nail on the left is shown after strength testing using the ISO 12777-1 method.

For plain clinched *pallet mat* nails the three levels in ISO 15629 are 2.5 Nm - HIGH, 2.2 Nm - MEDIUM and 1.9 Nm - LOW. (For more detailed information you should obtain BS EN ISO 15629 from BSI).

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