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HINGES FOR FURNITURE. A MATTER OF DURABILITY AND RESISTANCE

Many storage units that furnish our homes are equipped with a basic element that allows to connect the door to the structure of the furniture and let it be opened and closed in all its rotation: the hinge. The use of hinges in the furniture production, especially those on a vertical axis, has a long history dating back to the early 1900s with the production of

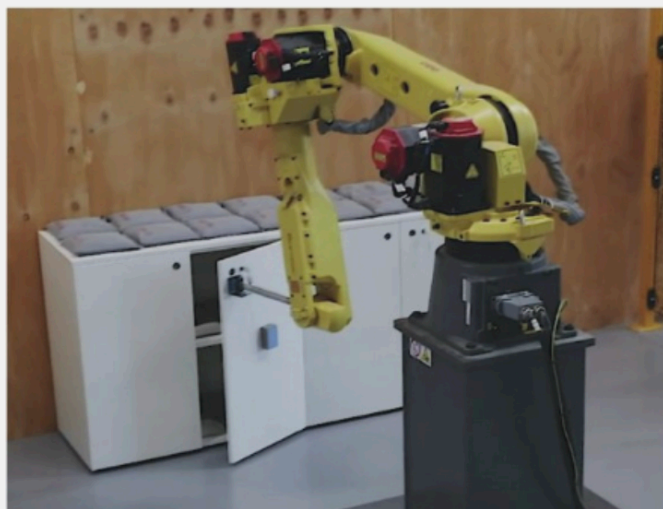
concealed hinges made of iron or brass. The evolution of hinges recorded the first great innovation at the end of the '50s with the filing of the first international patent covering a concealed self-closing furniture hinge.

For a long time, hinges have been considered to be a marginal accessory, both by furniture manufacturers



and the end customers, but in recent years they have become a design element that brings added value to the door or the furniture where they are mounted. The evolution of this product has not only been focused on improving its aesthetic impact, but also on the functionality and performance it can provide.

Hinges with different opening angles, with soft close mechanism or with self-close, hinges for glass, panel and metal doors are available on the market. Hinges for every taste and every need. However, these products must not only satisfy our aesthetic taste, they must also ensure the safety of the user by preventing the door detaching from the furniture and they must guarantee the performance for which they are intended and last over time. Their frequent use and the stress to which they are subjected make them one of the furniture components more subject to greater wear.



THE ROLE OF STANDARDS

Standards in the furniture sector help us verify the resistance and durability of hinges.

Some standards that can be used by hinges manufacturers and some other standards by the furniture manufacturers to ensure that the hinge purchased and installed on the door guarantees the required performance.

When we talk about hinges on vertical axis, hinge manufacturers can apply the EN 15570:2008 "Hardware for furniture - Strength and durability of hinges and their components - Hinges pivoting on a vertical axis". This European Standard specifies

test methods and requirements for the strength and durability of all types of hinges pivoting on a vertical axis and their components for all fields of application. The tests consist of the application of loads and forces simulating normal functional use, as well as misuse, that might reasonably be expected to occur. The test parameters shown in Table B.2 and Table B.3, columns 1, 2 and 3 are considered suitable for hinges for most fields of application from domestic to contract use. For example, the durability test (clause 6.3.7) requires to perform the following cycles in accordance to the performing level (1). In addition to the tests to be per-

formed, EN 15570 defines the maximum opening and closing forces and the maximum allowable deflection (sagging) of the door after the durability test.

The standard has been taken as a model for the development of an ISO standard (International Organization for Standardization).

The EN 15828:2010 "Hardware for furniture - Strength and durability of hinges and their components - Stays and hinges pivoting on a horizontal axis", can be used by the manufacturers of these products intended for doors with horizontal axis opening (top hinged flap or bottom hinged flap).

This standard specifies test methods and requirements for the strength and durability of all hinges, stays and systems which include hinges and stays pivoting on a horizontal axis and their components for all fields of application.

Also the EN 15828 provides stresses that reproduce normal functional use and any misuse that is reasonably conceivable and differentiates the tests in relation to the type of door opening (downwards or upwards). To cover most of the fields of application, from domestic use to non-domestic use, this standard also includes tables B.2 and B.3, structured on three levels.

For example, the durability test (clause 6.3.6), requires to performing the following cycles accordance to the chosen level and to the type of door opening (2) (3).

The document also defines the maximum opening and closing forces and the maximum allowable deflection (sagging) of the door after the durability test.

	Test		1	2	3
1	Durability clause 6.3.7	cycles	20.000	40.000	80.000
	Test		Top hinged flap	Top hinged flap	Top hinged flap
2			1	2	3
	Durability clause 6.3.6	cycles	10.000	20.000	40.000
	Test		Bottom hinged flap	Bottom hinged flap	Bottom hinged flap
3			1	2	3
	Durability clause 6.3.6	cycles	5.000	10.000	20.000

INNOVATION



The EN 15570 and EN 15828 requires the tests to be carried out on a test frame with specific properties and the hinges shall be mounted on a particle board, with specified properties, unless otherwise specified by the manufacturer.

For both standards the determination of corrosion resistance according to EN ISO 6270-2 "Paints and varnishes - Determination of resistance to humidity -- Part 2: Condensation (in-cabinet exposure with heated water reservoir)" is also requested. After 3 cycles in a wet-static chamber according to the AHT method (1 cycles= 24hours of testing), with the exception of cutting edges, screw slots, rivet heads, aluminum and molded parts of zinc, all parts which are visible once the hinges are mounted shall show no corrosion. The function shall be maintained.

The two standards foresee carrying out the tests using three groups of hinges:

- the first set shall be used for the overload tests
- the second set shall be used for the functional tests
- the corrosion test.

Finally, the two documents require the manufacturer to provide a series of information on the product in order to assist furniture manufacturers/developers in choosing the correct hinge for a given purpose.

The product information shall include: information regarding the material(s) for which the hinge(s) are suitable, e.g. solid wood, particle board, glass; information regarding the test results carried out in accordance with the relevant standards; information regarding the mass in kg, the size of the door and number of hinges for which the hinge(s) will fulfil the requirements of this standard; information regarding the presence of adjustment systems and spring and damper mechanisms; information on whether the corrosion test has been carried out and whether the requirement has been fulfilled.

ABOUT CATAS BRIANZA

CATAS Brianza laboratory carries out tests on safety, strength and durability for finished products (seating, tables, storage units). These are for the most part the same carried out in the CATAS headquarters in San Giovanni al Natisone (Udine): the experience, competence and specialization of the leading European laboratory in the wood and furniture sector is on hand also for the companies of this relevant production area. But not only that: today customers both from Italy and from abroad take the CATAS laboratory in Lissone as a technical reference point for mechanical tests on furniture products.

The Catas Brianza laboratory stands out for some exclusive and dedicated specializations: tests on partition walls, on interior doors and, in particular, on mattresses. Catas Brianza has been the first laboratory in Italy to start testing activities for the durability of mattresses, a primacy that has become experience and competence still recognized in the sector nowadays.



Dedicated tests on mattresses at CATAS Lissone



CATAS Lissone, in the heart of Brianza region