Chemical, physical and mechanical characteristics of Aluminium

Pure aluminium is a soft, ductile material, which limit its use and application. The addition of alloying elements (mainly magnesium, silicon, copper, zinc or manganese) increases its mechanical properties considerably, leading to its widespread use in areas where a good relation between strength and weight and a good corrosion resistance are required.

One of the most common alloys with excellent characteristics is Al7075 (commonly referred as Ergal), which includes, magnesium and copper, giving it the highest mechanical characteristic of aluminum alloys.

Aluminium alloys, when heat treated, obtain a higher tensile strength and increased mechanical properties, such as impact, weight and torsion resistance, and they become competitive with some steels , but with a volume density approximately three times lower.

The main characteristics of aluminium that allow its widespread use in many different areas are:

- Lightness (about 1/3 compared to steel)
- Excellent workability on machines and excellent quality of surface finish
- Bright and aesthetically pleasing appearance
- Good corrosion resistance
- Good mechanical resistance

Al7075 is a light alloy which provides a high mechanical resistance as well as good vibration absorption, therefore it is used in a wide range of screws for aerospace and aeronautical applications, and also in the bicycle and motorcycle industries.

	Screws/Bolts			Washers	
Designation	**P60**	**P65**	**P40**	**H14**	**Grade 3(H22)**
ISO 209-2007	AlZn5.5MgCu	AlZn5.5MgCu	AlMgSi	Al99,5	AlMg3
Grade	7075	7075	6060/6101	1050	5754
Heat Treatment ISO 2107:2004	T6	T73	T8	H14	H26
Manufacturing Process	-	-	-	Pressing	Pressing
Tensile Strength N/mm²	550	490	270	260	200
Yield Strength N/mm²	460	420	240	210	280
Elongation after rupture min%	7	11	6	4	7
Hardness HB	160/185	146/169	95/105	72	63