Stainless Steel Applications – Consumer and Leisure

A short description of the various grades of stainless steel used for consumer goods and certain types of leisure equipment. It has been written primarily from a European perspective and may not fully reflect the practice in other regions.

Materials for consumer products are selected for their corrosion resistance, for their aesthetic appearance, ease of cleaning and mechanical strength. Stainless steels are used in white goods because they are resistant to corrosion, easily fabricated, offer good mechanical properties over a wide range of temperatures and are able to accept a range of pleasing finishes.

The following examples may serve to indicate the considerations made in selecting a suitable grade of stainless steel for consumer products. Austenitic stainless steel grade 1.4305 (AISI 303) exhibits free-machining properties and, traditionally, has been used for ear studs. As EU legislation governing nickel release from products no longer permits the use of this material for such applications, alternative stainless steel grades, containing normal levels of sulphur, are available for applications not involving epithelization (eg 14301/AISI 304, 1.4401/AISI 316 and their derivatives). The free-machining properties of these stainless steel grades can be enhanced by the addition of other chemical elements (eg calcium). Until recently, 1.4401 (AISI 316) and 1.4404 (AISI 316L) have been used for jewellery involved in body piercing. However, because they contain >0.05% of nickel, EU legislation now prohibits their use for applications involving epithelization.

Stainless steels 1.4016 (AISI 430), 1.4301 (AISI 304), 1.4401 (AISI 316) and their derivatives are widely used in cabinets for, and internal components of, white goods (e.g. washing machines, refrigerators, etc).

Typical applications for stainless steels in consumer products are shown in the table below.

Consumer Products – Applications and Grades

Application/Use	Stainless Steel	
	Type	**EN 10088 Grade**
Belt buckles, bottle openers, candle holders, hip flasks, key ring fobs, money clips, torch bodies, casings for pens and pencils	Austenitic	1.4301 (AISI 304) 1.4307 (AISI 304L)
Jewellery e.g. earrings, ear studs, pendants, etc	Austenitic	[1.4305 (AISI 303)]* 1.4301 (AISI 304) 1.4307 (AISI 304L) 1.4401 (AISI 316) 1.4404 (AISI 316L)
Jewellery for body piercing	Austenitic	1.4401 (AISI 316) 1.4404 (AISI 316L)
Watch casings and straps	Austenitic	[1.4305 (AISI 303)]* 1.4301 (AISI 304) 1.4307 (AISI 304L) 1.4401 (AISI 316) 1.4404 (AISI 316L)
Watch backs	Austenitic	[1.4305 (AISI 303)]* 1.4301 (AISI 304) 1.4307 (AISI 304L) 1.4401 (AISI 316) 1.4404 (AISI 316L)
	Ferritic	1.4016 (AISI 430)

Application/Use	Stainless Steel	
	Type	**EN 10088 Grade**
Watch buckles	Austenitic	1.4301 (AISI 304) 1.4307 (AISI 304L)
Watch straps	Austenitic	1.4301 (AISI 304) 1.4307 (AISI 304L) 1.4372 (AISI 201)
Washing machine drums, casings and panels for cookers, microwave ovens, refrigerators, freezers, toasters, washing machines and dish washers	Austenitic Ferritic	1.4301 (AISI 304) 1.4307 (AISI 304L) 1.4016 (AISI 430) 1.4510
Refrigerator and freezer components	Austenitic	1.4301 (AISI 304) 1.4307 (AISI 304L)
Hot water tanks	Austenitic Ferritic	1.4401 (AISI 316) 1.4404 (AISI 316L) 1.4571 (AISI 316Ti) 1.4520 1.4521
Kitchen cabinets and worktops, sinks and drainers	Austenitic Ferritic	1.4301 (AISI 304) 1.4307 (AISI 304L) 1.4016 (AISI 430) 1.4510

*- Not permitted for this use in EU countries.

Leisure

Materials for leisure products are selected for their corrosion resistance, for their aesthetic appearance, ease of cleaning and mechanical strength. Stainless steels are used in leisure goods because they are resistant to corrosion, easily fabricated, offer good mechanical properties over a wide range of temperatures and are able to accept a range of pleasing finishes.

For stainless steels used in sailing equipment see "Marine Applications" and for fishing/hunting knives see the "Food & Beverage" section.

Typical applications for stainless steels in leisure products are shown in the table below.

Leisure Products – Applications and Grades

Application/Use	Stainless Steel	
	Type	**EN 10088 Grade**
Golf clubs (heads of)	Precipitation Hardening	1.4542 (17/4 PH)
Golf shoes (plate for attaching studs)	Austenitic	1.4301 (AISI 304) 1.4307 (AISI 304L)
Model railway lines	Ferritic	1.4016 (AISI 430)
Swimming pool filter grills, pipelines, water treatment and filter units,	Austenitic	1.4401 (AISI 316) 1.4404 (AISI 316L)
Swimming pool handrails, ladders and steps, pool liners	Austenitic	1.4401 (AISI 316) 1.4404 (AISI 316L)

Application/Use	Stainless Steel	
	Type	**EN 10088 Grade**
Swimming pool ceiling tile and flume support brackets/fasteners	Austenitic	1.4539 (ASTM N08904) 1.4438 (AISI 317L)
Computer discs (sliding gates for)	Austenitic	1.4301 (AISI 304) 1.4307 (AISI 304L)

Footnote: The above information has been extracted from a document prepared by Tony Newson of Eurofer, Brussels, whose objective was to provide a summary of the basic grades of stainless steel commercially available and to indicate which grades are most commonly used in some of the principal application categories.

Broad categories of use (e.g. transport, consumer goods etc) are defined, along with the stainless steel grades most commonly used for those applications. Although this extract deals only with consumer and leisure related applications, similar summaries can be found under the following library headings:

- *What can stainless steel do for… - Transport*
    - o *Automotive*
    - o *Shipbuilding/Marine*
    - o *Railway*
    - o *Aerospace*