



BRIEF



DRAFT



DESIGN



DELIVER



MERO  Digital

El proceso de diseño

Introducción

1900

1940

2012

2050?

Cameras



Phones



Toilets



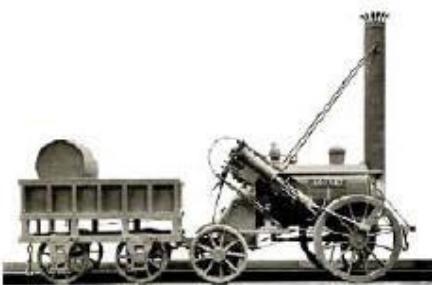
Introducción

1900

1940

2012

2050?



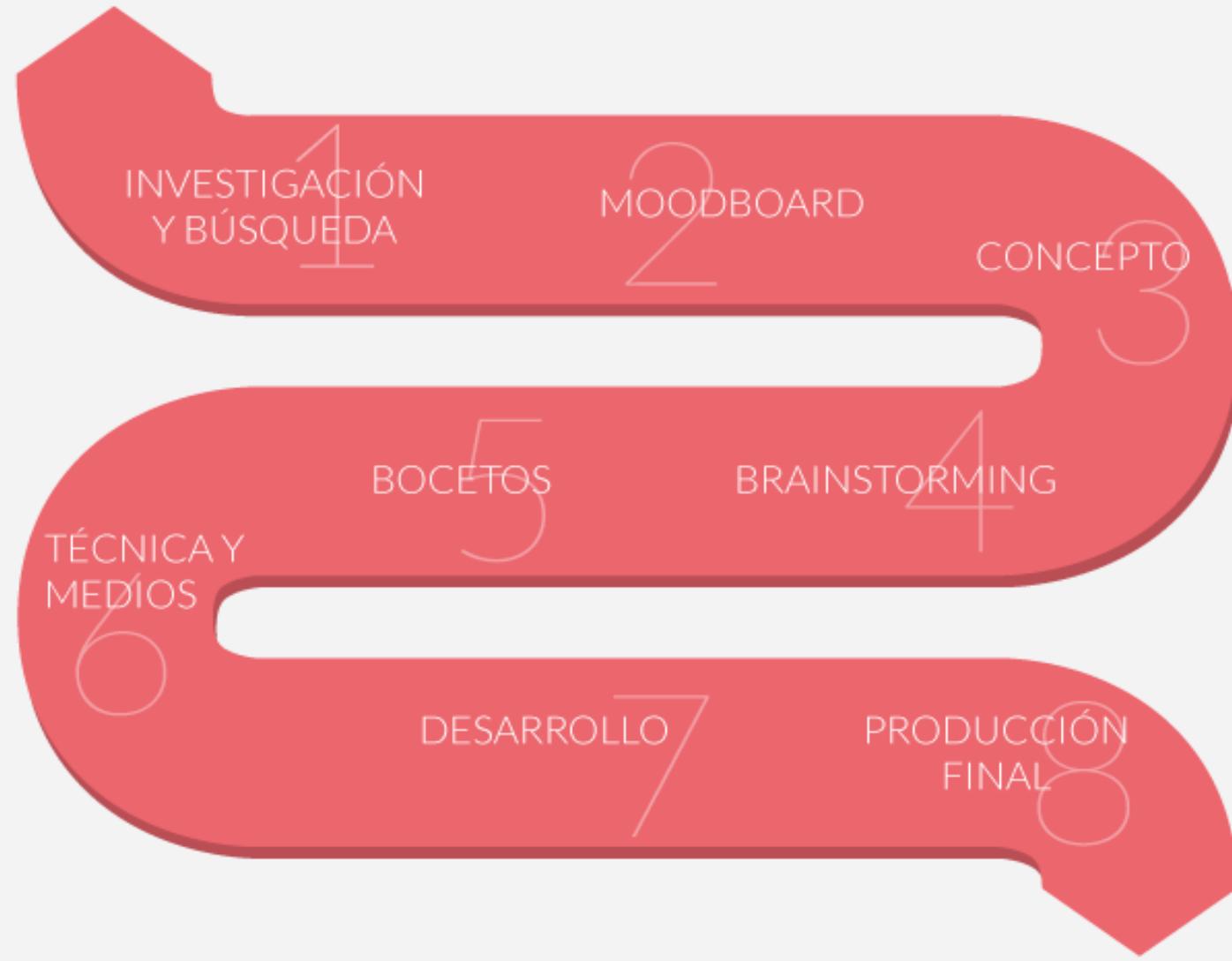
Bikes

Trains

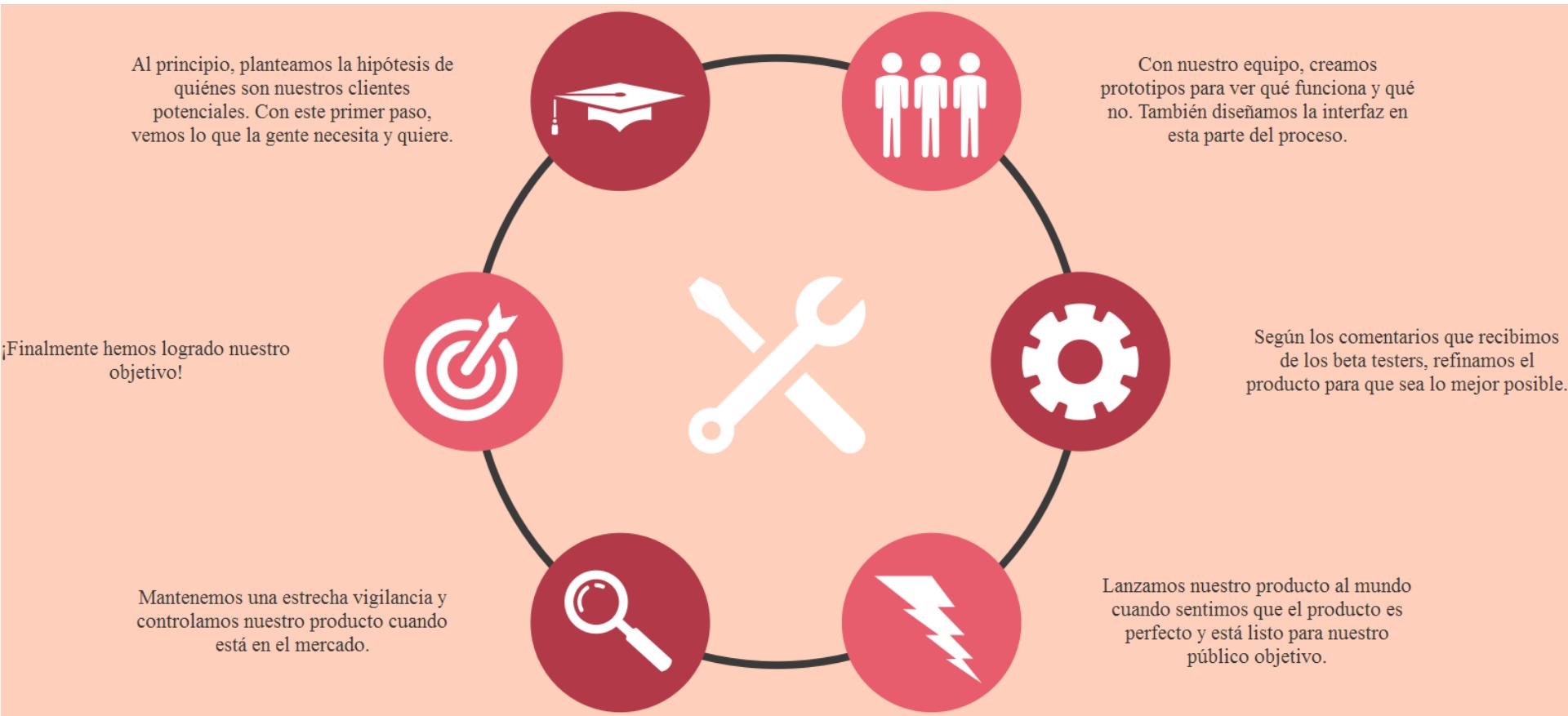
Planes

Introducción

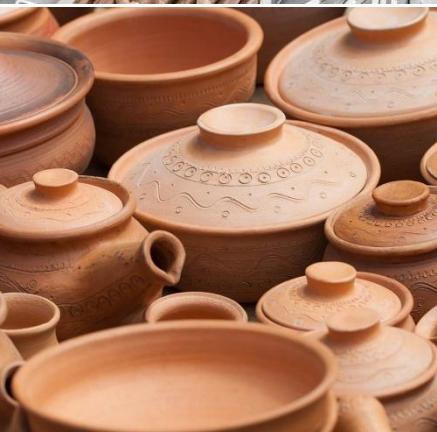
BRIEFING



Introducción



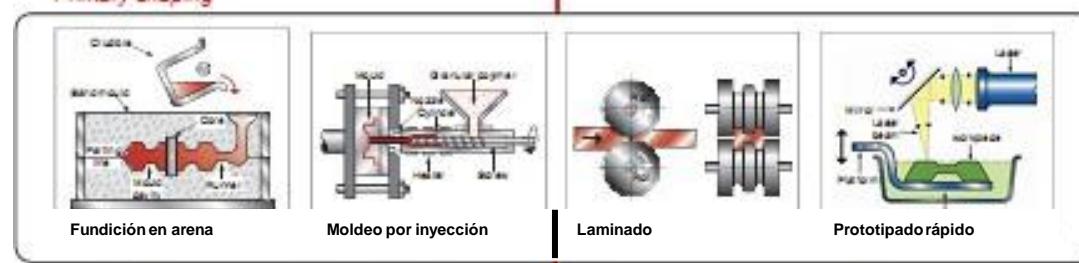
Tipos de materiales



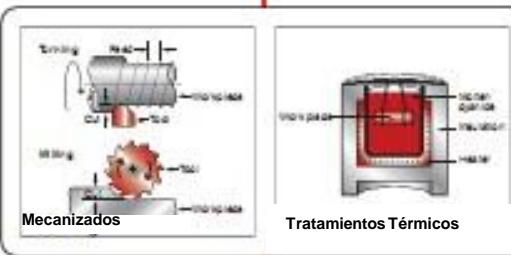
Materias primas

Procesos primarios

Primary shaping

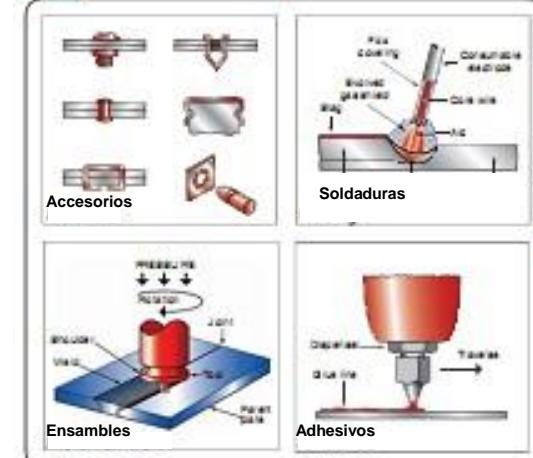


Procesos secundarios



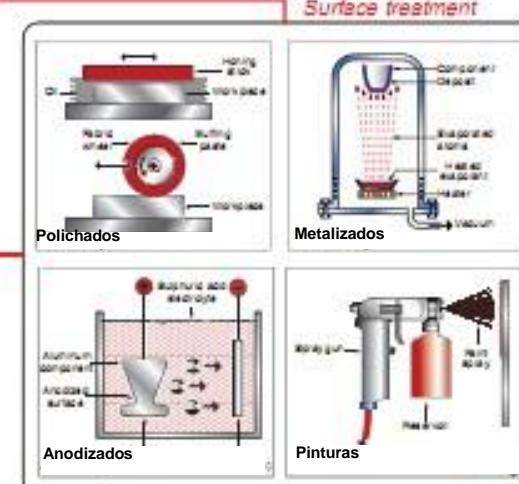
Procesos de Unión

Joining



Tratamientos superficiales

Surface treatment



Producto terminado

Metodología de Diseño Industrial





Problema de Diseño

Problema de Diseño

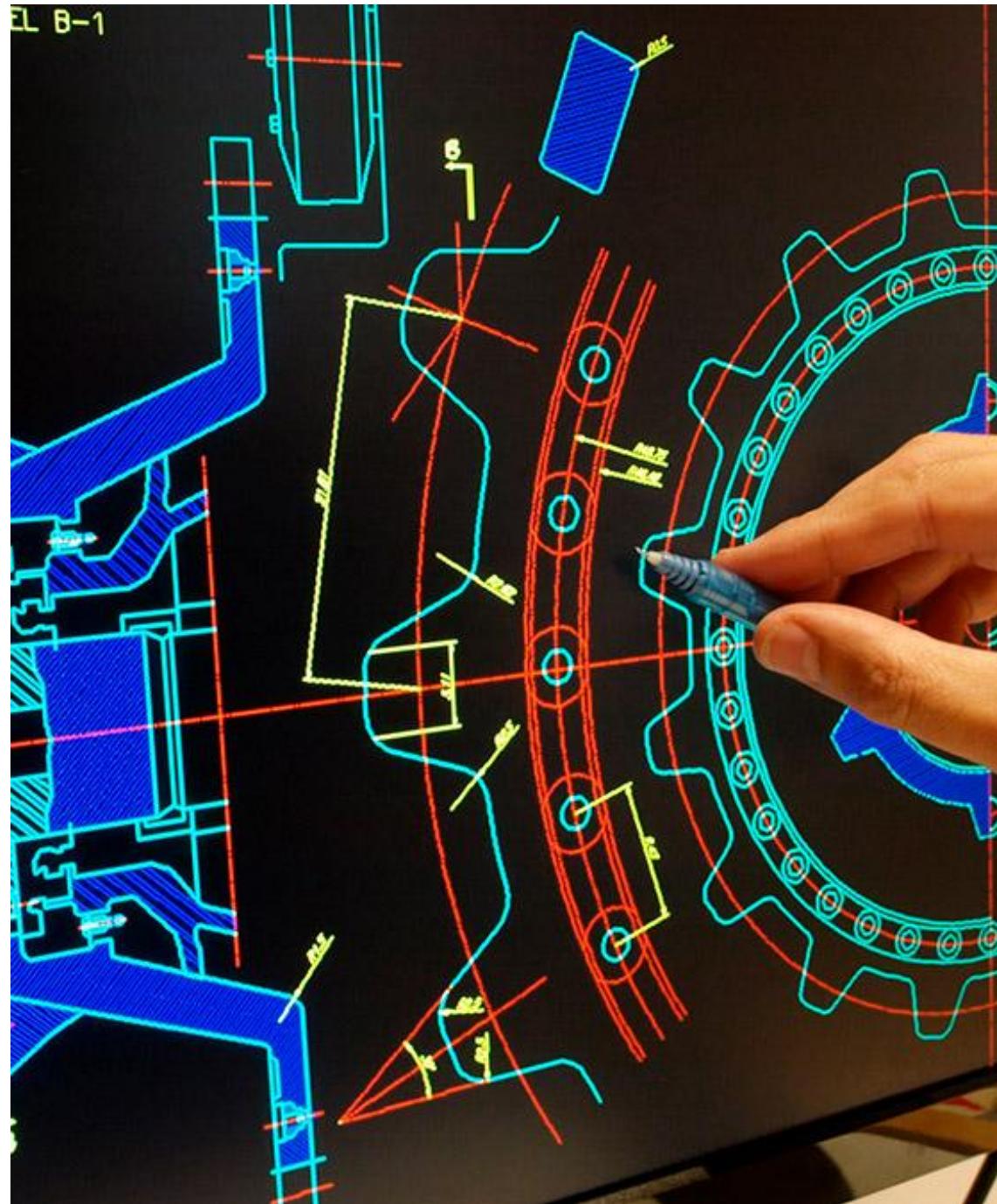
Concepto de Diseño





Configuración del Producto

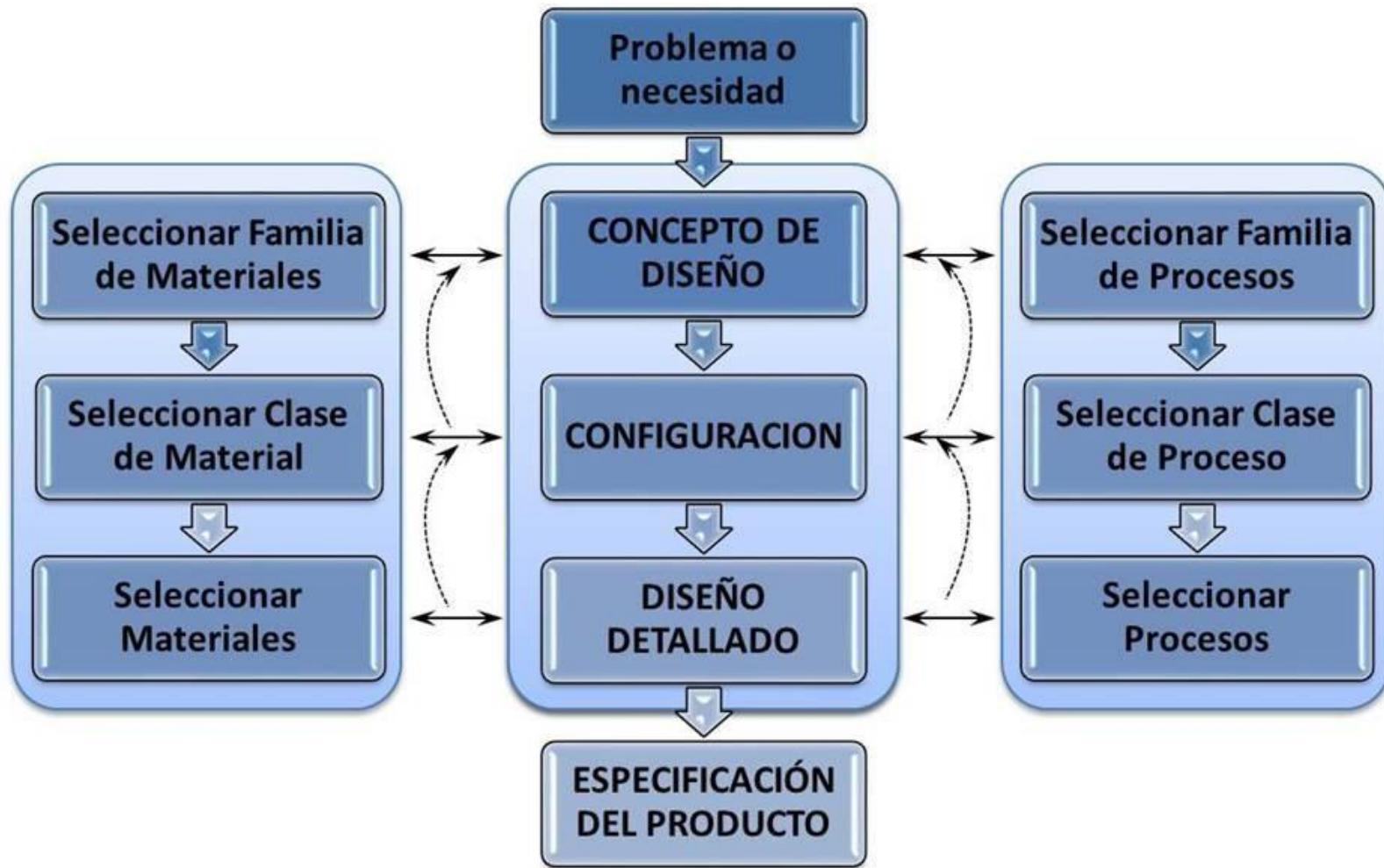
Diseño detallado





Producto terminado

Metodología con selección de Materiales y Procesos



Taxonomía de Clasificación de Materiales



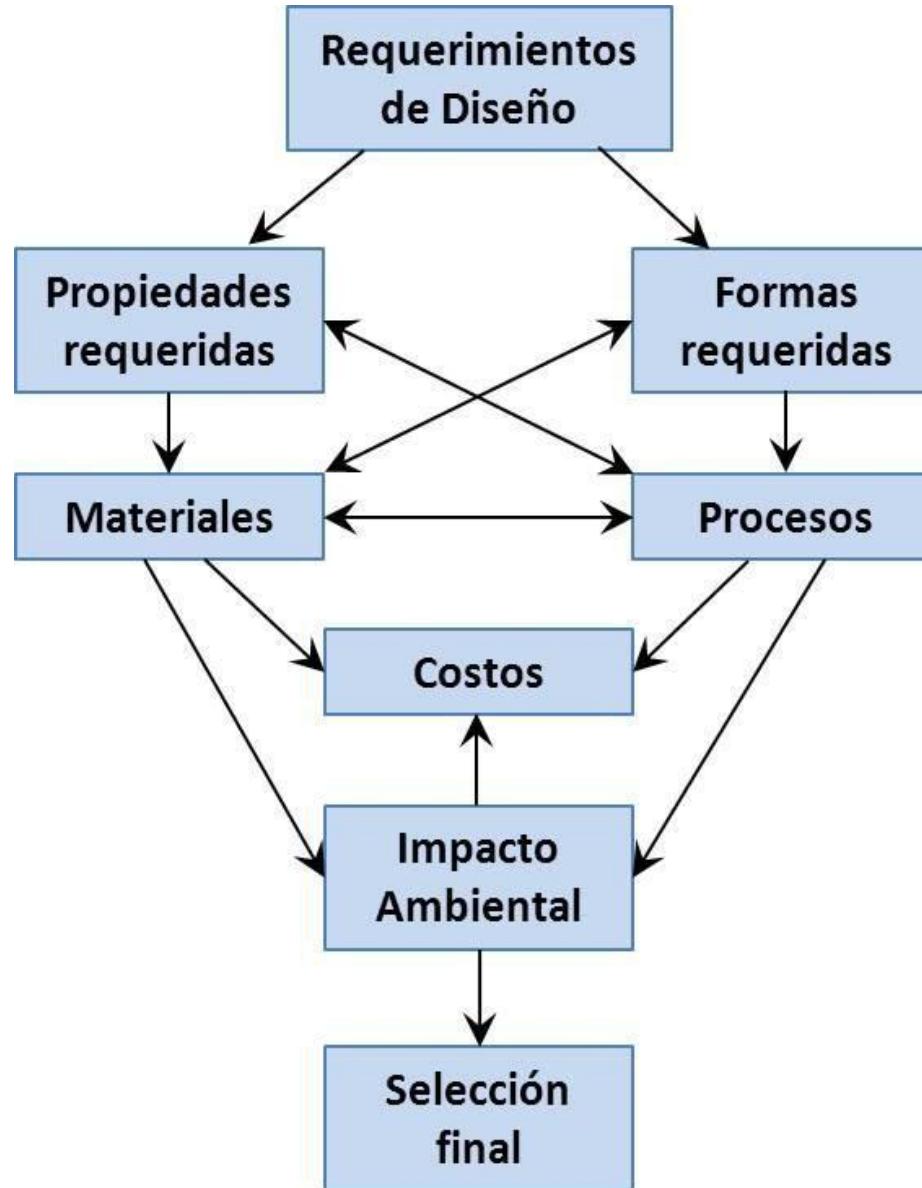
Taxonomía de Clasificación de Procesos



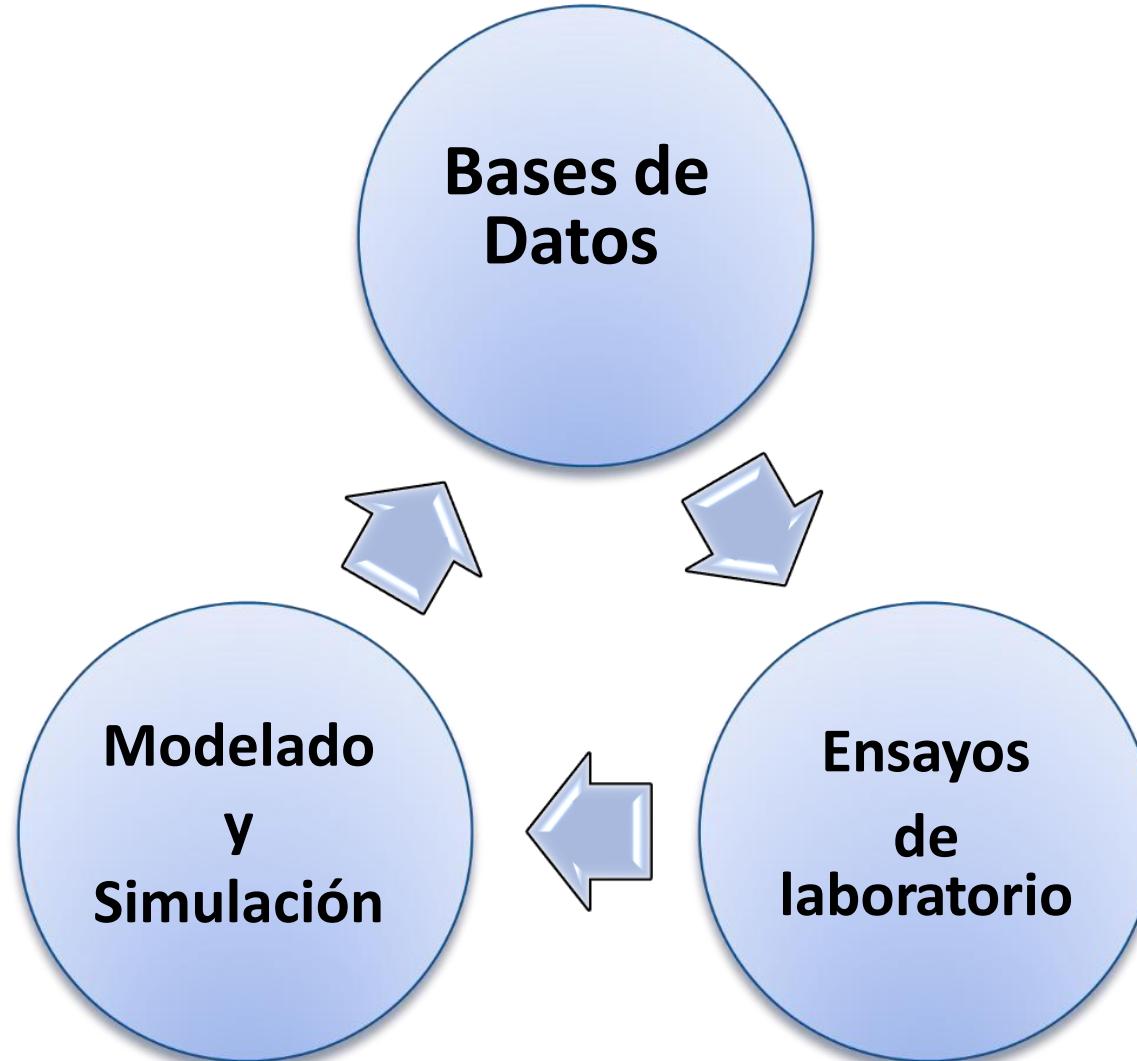
Estrategia de Selección



Factores que intervienen



Herramientas para análisis y selección



Bases de datos

● Mat Web. com

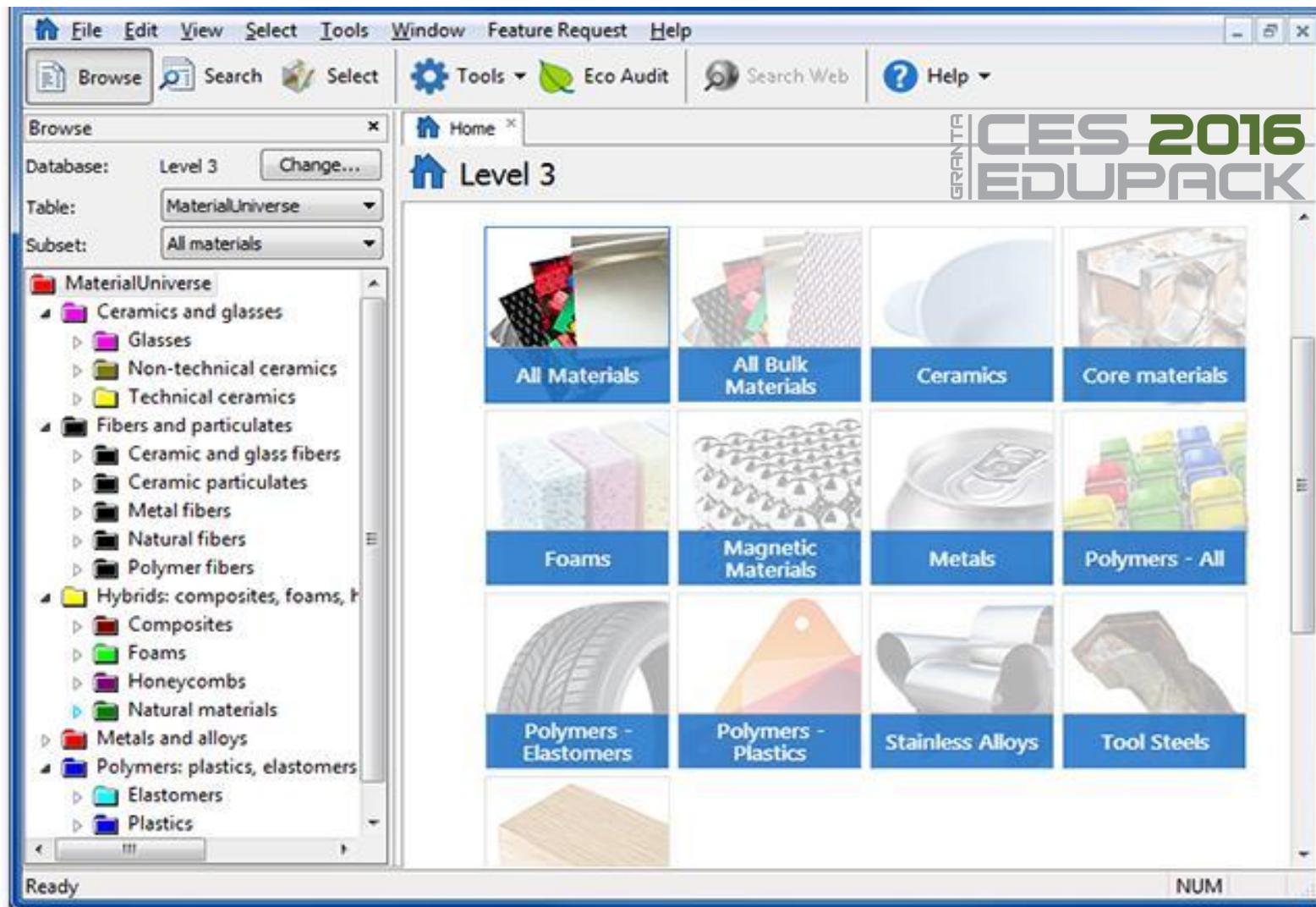


The screenshot shows the Mat Web. com website. At the top, there is a search bar with the URL www.matweb.com/search/Mat. Below the search bar is the Mat Web logo with the tagline "MATERIAL PROPERTY DATA". A navigation bar with links to "Data sheets", "Search", "Advanced", "Category", "Property", "Metals", and "Trade Name" is visible. The main content area is titled "Material Category Search". It features a "Find a Material Category:" input field and a "Select a Material Category:" dropdown menu. The dropdown menu lists several categories with their respective counts of materials: Carbon (793 matls), Ceramic (8496 matls), Fluid (6146 matls), Metal (15261 matls), Other Engineering Material (6046 matls), Polymer (84189 matls), Pure Element (479 matls), and Wood and Natural Products (389 matls). A "Selected Material Category:" field shows the value "none". At the bottom are "FIND" and "RESET" buttons.

Physical Properties	Metric	English
Density	2.70 g/cc	0.0975 lb/in ³
Mechanical Properties	Metric	English
Hardness, Brinell	30	30
Tensile Strength, Ultimate	124 MPa	18000 psi
Tensile Strength, Yield	55.2 MPa	8000 psi
Elongation at Break	25 % @Thickness 1.59 mm	25 % @Thickness 0.0625 in
	30 % @Diameter 12.7 mm	30 % @Diameter 0.500 in
Modulus of Elasticity	68.9 GPa	10000 ksi
Ultimate Bearing Strength	228 MPa	33100 psi
Bearing Yield Strength	103 MPa	14900 psi
Poissons Ratio	0.33	0.33
Fatigue Strength	62.1 MPa @# of Cycles 5.00e+8	9000 psi @# of Cycles 5.00e+8
Machinability	30 %	30 %
Shear Modulus	26.0 GPa	3770 ksi
Shear Strength	82.7 MPa	12000 psi
Electrical Properties	Metric	English
Electrical Resistivity	0.00000366 ohm-cm @Temperature 20.0 °C	0.00000366 ohm-cm @Temperature 68.0 °F
Thermal Properties	Metric	English
CTE, linear 	23.6 µm/m-°C @Temperature 20.0 - 100 °C	13.1 µin/in-°F @Temperature 68.0 - 212 °F
	25.2 µm/m-°C @Temperature 20.0 - 300 °C	14.0 µin/in-°F @Temperature 68.0 - 572 °F
Specific Heat Capacity	0.896 J/g-°C	0.214 BTU/lb-°F
Thermal Conductivity	180 W/m-K	1250 BTU-in/hr-ft ² -°F
Melting Point	582 - 651.7 °C	1080 - 1205 °F
Solidus	582 °C	1080 °F
Liquidus	651.7 °C	1205 °F
Processing Properties	Metric	English
Solution Temperature	529 °C	985 °F
Aging Temperature	160 °C	320 °F
	177 °C	350 °F

Bases de datos

● CES Edupack



Cartas de Materiales

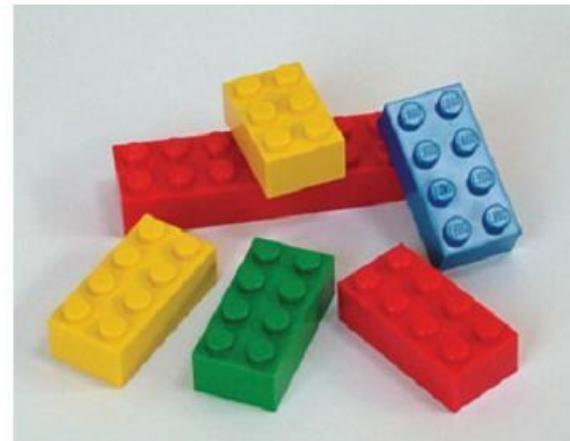
Acrylonitrile–butadiene–styrene (ABS)

The Material

ABS (acrylonitrile–butadiene–styrene) is tough, resilient and easily molded. It is usually opaque, although some grades can now be transparent, and it can be given vivid colors. ABS–PVC alloys are tougher than standard ABS and, in self-extinguishing grades, are used for the casings of power tools.

General properties

Density	1e3	–	1.2e3	kg/m ³
Price	2	–	2.7	USD/kg



Mechanical properties

Young's modulus	1.1	–	2.9	GPa
Hardness—Vickers	5.6	–	15	HV
Elastic limit	19	–	51	MPa
Tensile strength	28	–	55	MPa
Compressive strength	31	–	86	MPa
Elongation	1.5	–	1e2	%
Endurance limit	11	–	22	MPa
Fracture toughness	1.2	–	4.3	MPa.m ^{1/2}

Thermal properties

Thermal conductivity	0.19	–	0.34	W/m.k
Thermal expansion	85	–	230	μ strain/°C
Specific heat	1400	–	1900	J/kg.K
Glass temperature	88	–	130	°C
Max service temp.	62	–	90	°C
Electrical properties				
Resistivity	2.3e21	–	3e22	μohm.cm
Dielectric constant	2.8	–	2.2	

Typical uses

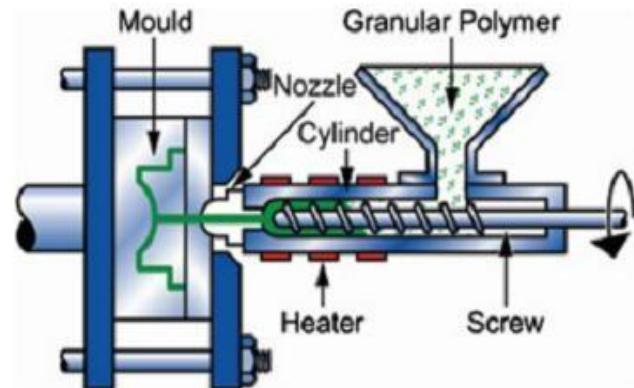
Safety helmets; camper tops; automotive instrument panels and other interior components; pipe fittings; home-security devices and housings for small appliances; communications equipment; business machines; plumbing hardware; automobile grilles; wheel covers; mirror housings; refrigerator liners; luggage shells; tote trays; mower shrouds; boat hulls; large components for recreational vehicles; weather seals; glass beading; refrigerator breaker strips; conduit; pipe for drain-waste-vent (DWV) systems.

Cartas de Procesos

Injection molding

The process

No other process has changed product design more than INJECTION MOLDING. Injection molded products appear in every sector of product design: consumer products, business, industrial, computers, communication, medical and research products, toys, cosmetic packaging and sports equipment. The most common equipment for molding thermoplastics is the reciprocating screw machine, shown schematically in the figure. Polymer granules are fed into a spiral press where they mix and soften to a dough-like consistency that can be forced through one or more channels ('sprues') into the die. The polymer solidifies under pressure and the component is then ejected.



Physical attributes

Mass range	1e-3	–	25	kg
Range of section thickness	0.4	–	6.3	mm
Surface roughness (A = v. smooth)	A			

Economic attributes

Economic batch size (units)	1e4	–	1e6
Relative tooling cost	very high		
Relative equipment cost	high		
Labor intensity	low		

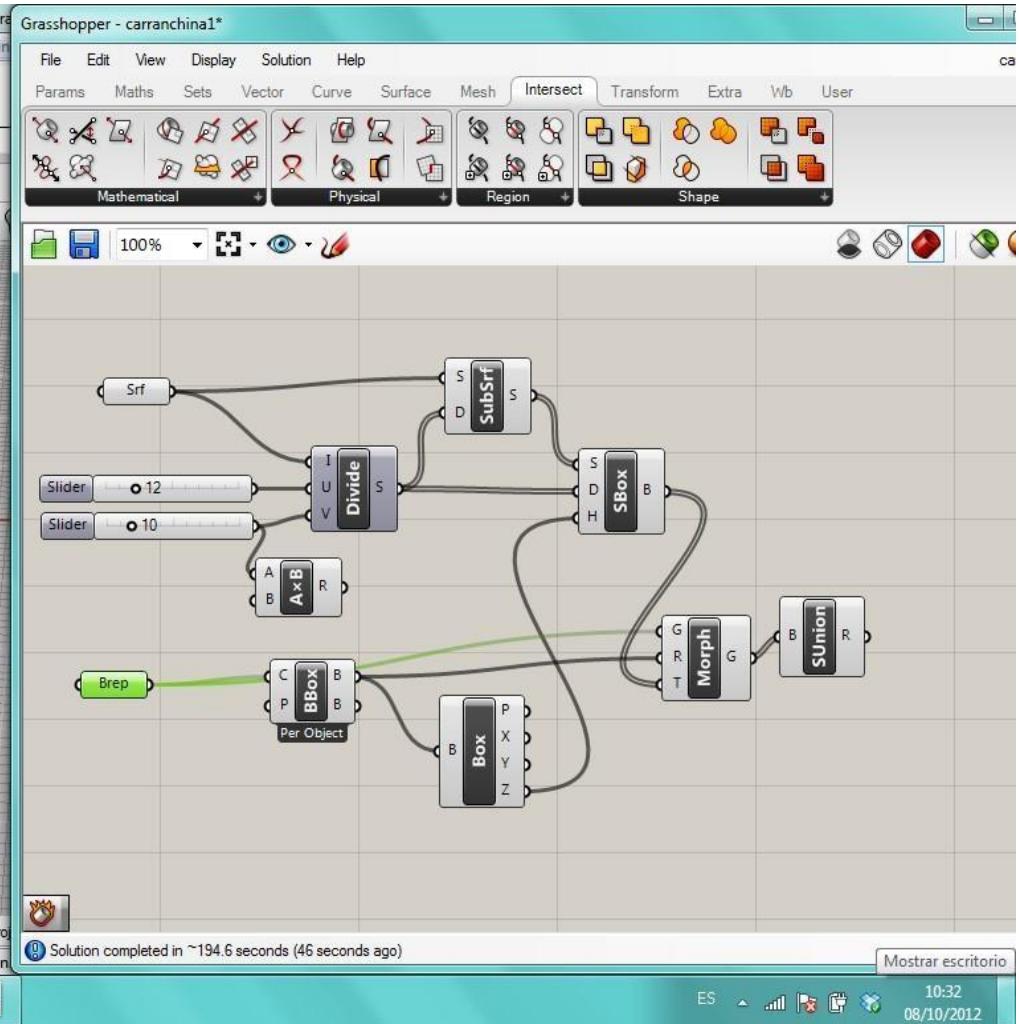
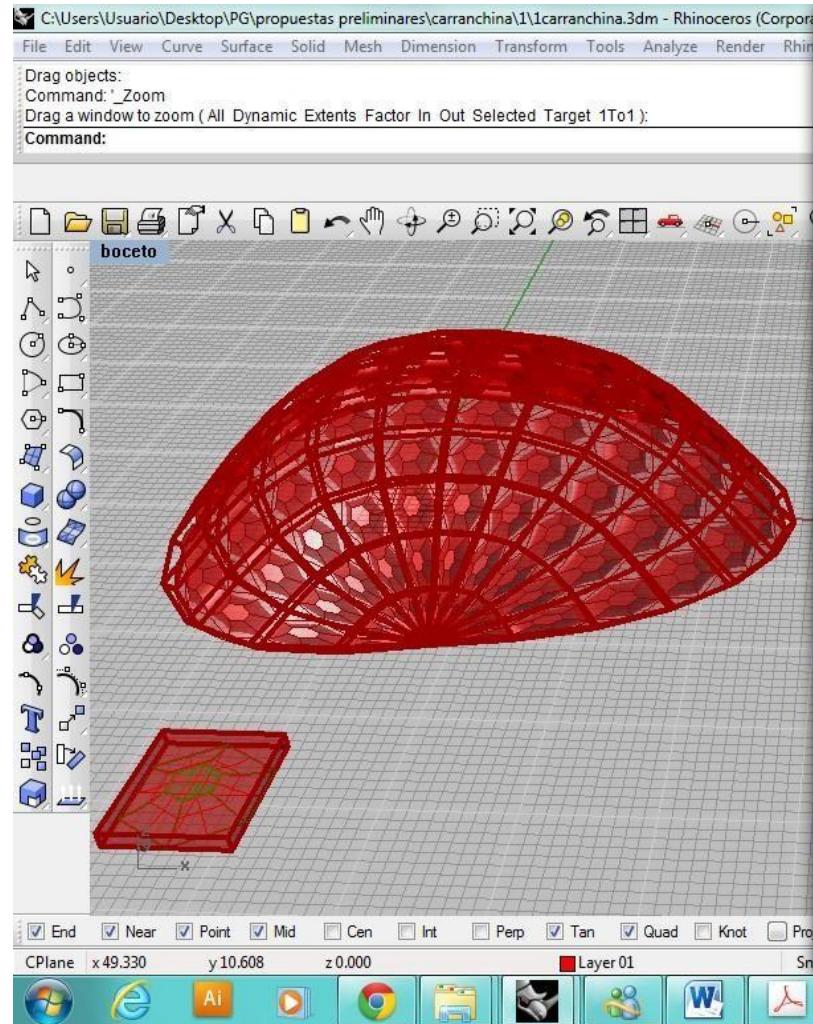
Typical uses

Extremely varied. Housings, containers, covers, knobs, tool handles, plumbing fittings, lenses, etc.

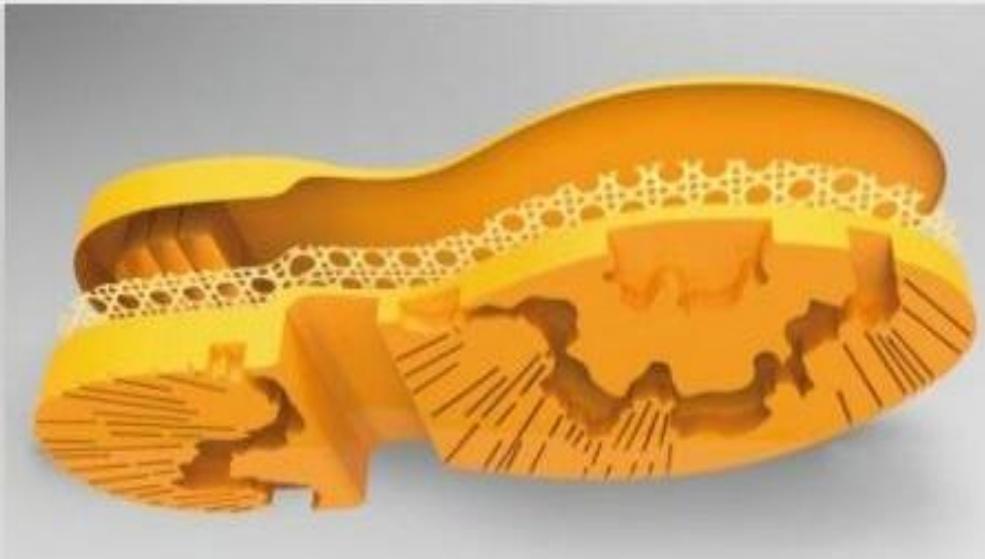
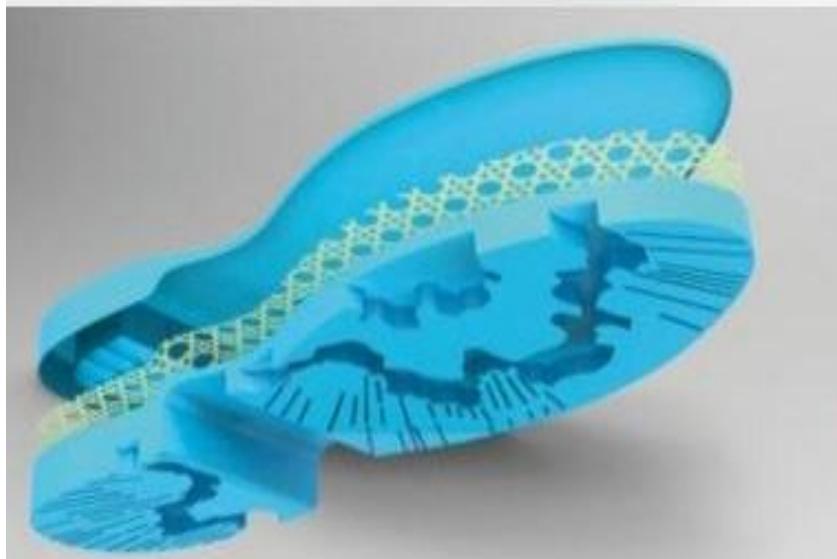
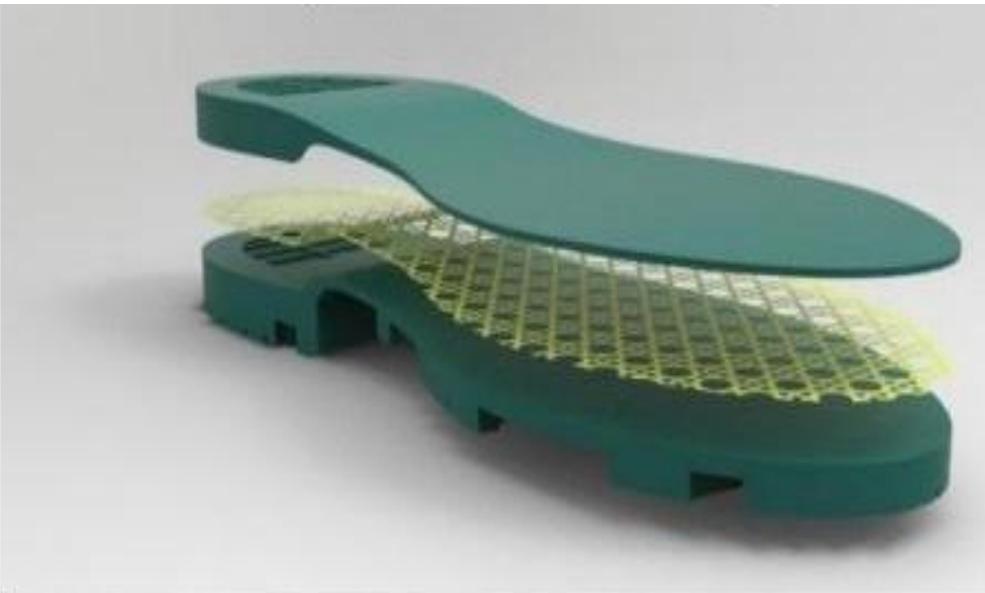
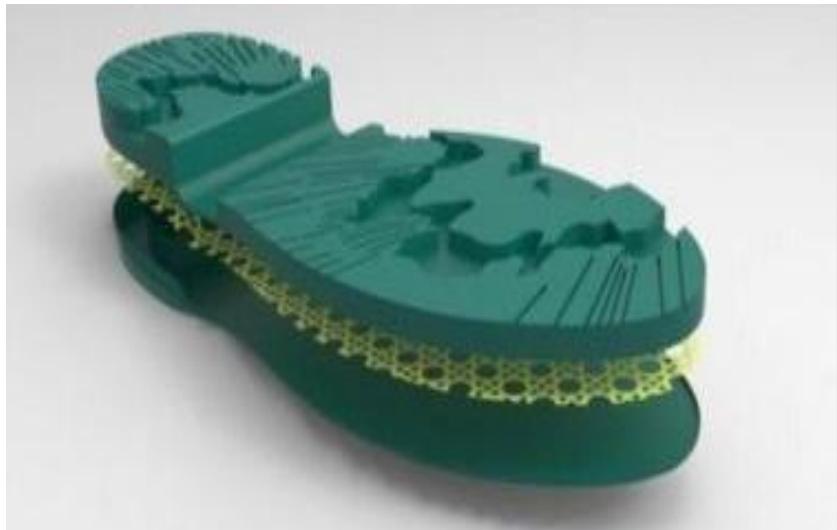
Shape

Circular prismatic	True
Non-circular prismatic	True
Solid 3-D	True
Hollow 3-D	True

Modelado y simulación

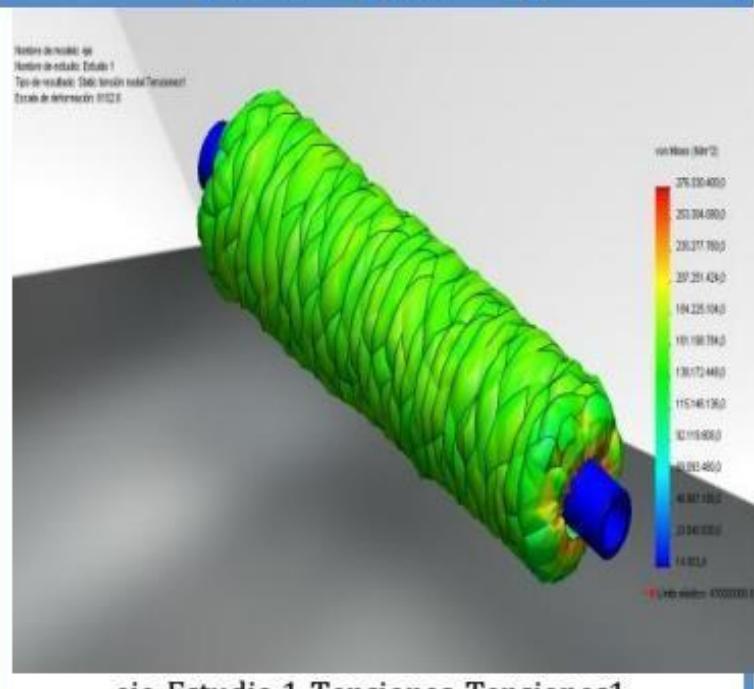


Modelado y simulación

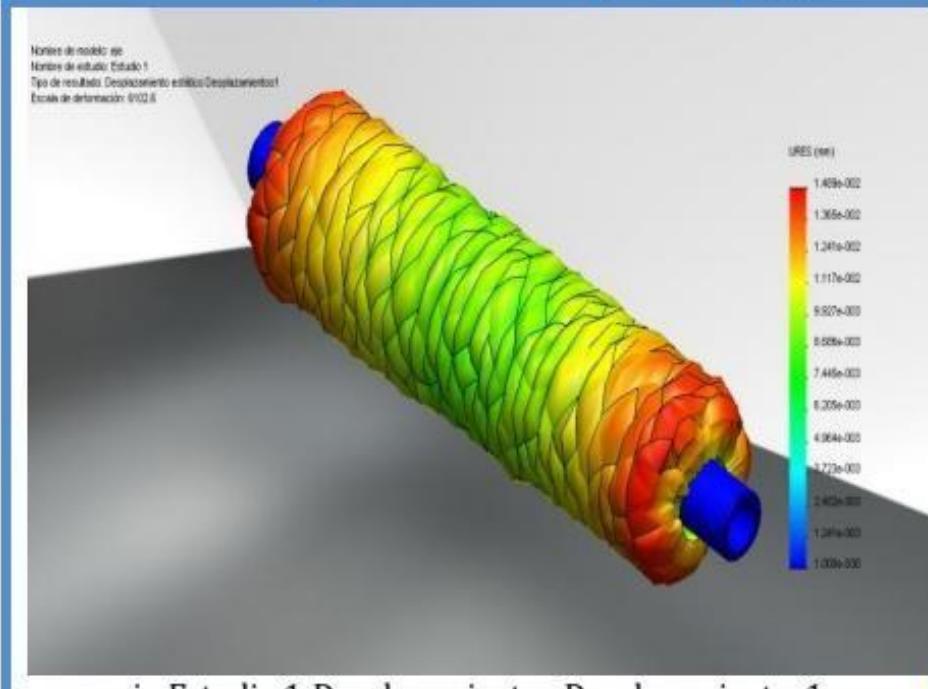


Modelado y simulación

Nombre	Tipo	Mín.	Máx.
Tensiones1	VON: Tensión de von Mises	14503.4 N/m ² Nodo: 610	2.7633e+00 8 N/m ² Nodo: 179



Nombre	Tipo	Mín.	Máx.
Desplazamientos1	URES: Desplazamiento resultante	0 mm Nodo: 1	0.0148909 mm Nodo: 1370



Modelado y simulación



Bibliografía

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