

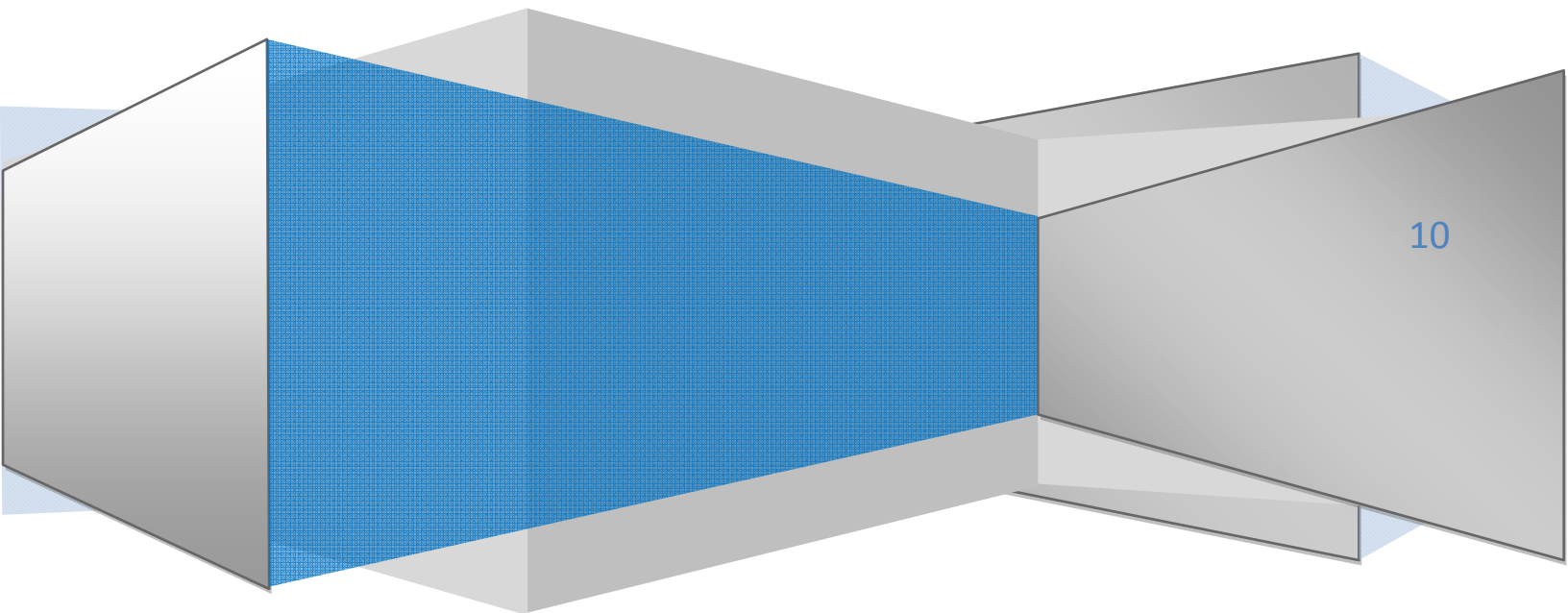
**Celtec Rail Pty Ltd**

ABN 41 128 376 045



# Castings

Your choice of rail parts!



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2012

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## 1.0 About us

Celtec Rail supply castings to the rail and transport industry.

We can assist you to turn fabricated components into cost efficient castings ready for installation. Many of our cast parts are standard items commonly used in the Rail Industry.

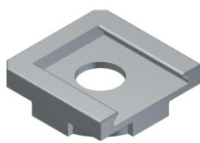
Celtec Rail can also supply cast customized parts to customers who provide us with specifications and specific requirements.

One of our well known products is the Cel-Lock™ Twist locks. The Cel-Lock™ Twist locks are supplied to both for manual and fully automatic operations.

The complete range of Cel-Lock™ for double stack operation, fully automatic Cel-Lock™ to secure ISO containers together with location cones and container guides for well wagons gives you the opportunity to treat Celtec Rail as a one stop shop when transporting containers.

## 2.0 The foundry

A foundry is a factory which manufactures steel castings from ferrous or non ferrous alloys. Metals are turned into parts by melting the metal into a liquid, pouring the metal into a mold and then removing the mold metal.



In 1972 the Foundry opened and in 2008 a brand new facility commenced operation casting by chemical re-circled sand using plate patterns in a semi-automatic molding line

suitable for large quality castings in a high volume capacity.

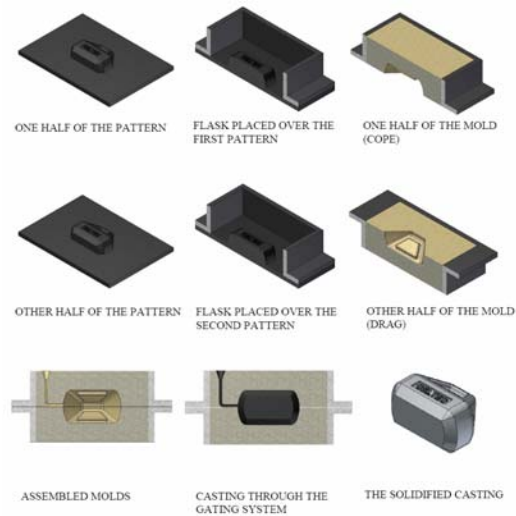
The parts are cast in cast iron, steel, ductile iron and stainless steel.

## 3.0 Casting process

A pattern is made in the shape of the required part. The pattern is made out of aluminum in the new foundry and normally wooden in the old established factory. Complex products require a pattern design in two parts called split pattern. The split pattern has

a top and a bottom part. The top part is called a cope and the bottom part is called a drag.

Both the simple pattern and the more complex patterns can have cores inserted to complete the final shape of the product that will be cast. Where the top and the bottom part separate using a split pattern is called a parting line.



It is imperative to be able to remove the pattern without damage to the mold. To be able to do this it is desirable to taper the edges.

The pattern is then packed with sand with a binder that will assist to harden the sand into a semi-permanent shape. When the sand mold is cured, the pattern is removed leaving a hollow space in the sand same as the desired part to be cast. Sand cores can be inserted into the mold to create holes to improve the shape of the casting.

The two pieces of molds are clamped together. The melted material is poured into the opening, called the gate. If required, vent holes will be created to allow gases to escape during pouring.

The temperature of the metal should be higher than the melting point to ensure good fluidity, thereby avoiding prematurely cooling, which will cause porosity.

When the metal cools, the sand mold is removed and thereafter the heads, runners and risers are removed which is called de-gating.

After de-gating, the casting is cleaned and then moved to the final step in the process which usually involves grinding or machining in order to achieve the required dimensional requirement, physical shape and surface finish.

We work closely with our customers during development of new parts and products. However the standard process is the same.

### 4.0 Product management

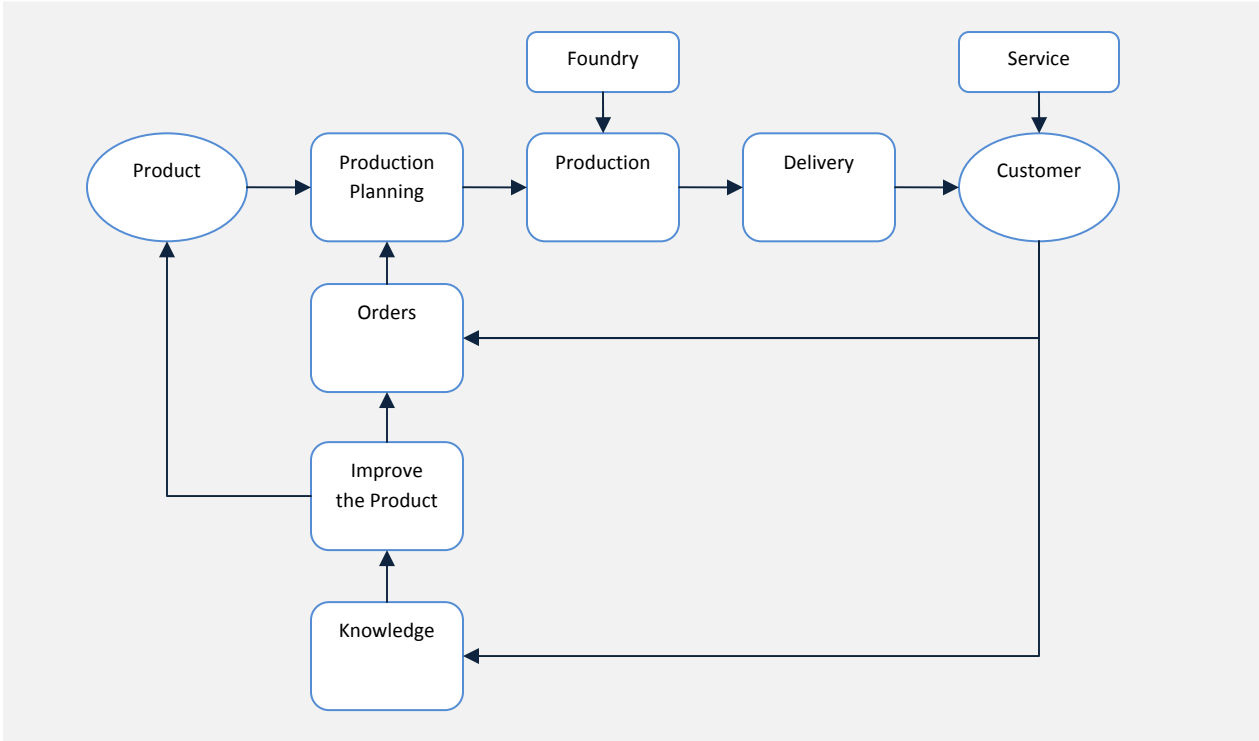


Figure 3, Product management

### 5.0 Tools to manage quality and ongoing production

A number of different tools are used to manage Quality. It depends on the product manufactured, performance requirement and the function.

- Go/No-Go test jigs
- Spectrometer for material data
- Measurement of hardness as required
- Solidity/Section cutting of castings
- FE analysis
- MT (Magnetic Particle Test) to check surface cracks as required.

The initial production of any product and the quality of all products are set by using industry benchmarking. We thereafter continuously strive to improve the product and its quality by using the strategy outline on the next page.

### 6.0 Strategy for improvement of product quality

Customer feedback is an important tool for us to continue to improve the quality of the products and service.

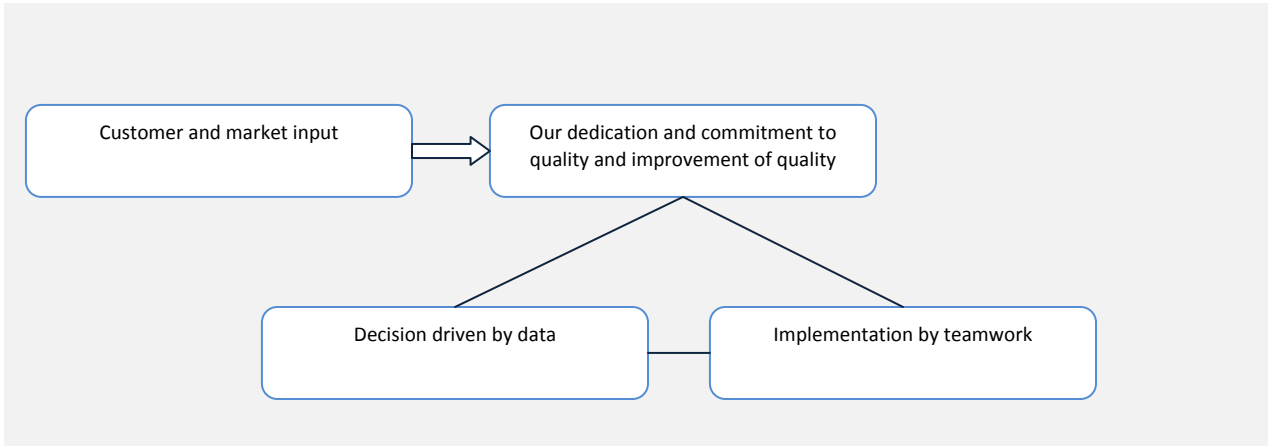


Figure 4, Strategy to improve product quality

### 7.0 Supply of a new product

- Identify the purpose of the part if not provided by the OEM.
- Design if not provided by the OEM.
- Selection of appropriate material and heat treatment as required if not provided by the OEM.
- Quantity and type of pattern used. Wooden, aluminum, plastic or steel.
- Pilot casting planning and manufacture.
- Solidity check by section cutting.
- Identify critical issues such as dimensions and other possible requirements.
- Design the quality control manual (QCM),
- Check dimensions, hardness, chemical & mechanical data and impact test as required on sample.

A simplified production process flow chart is shown on right.

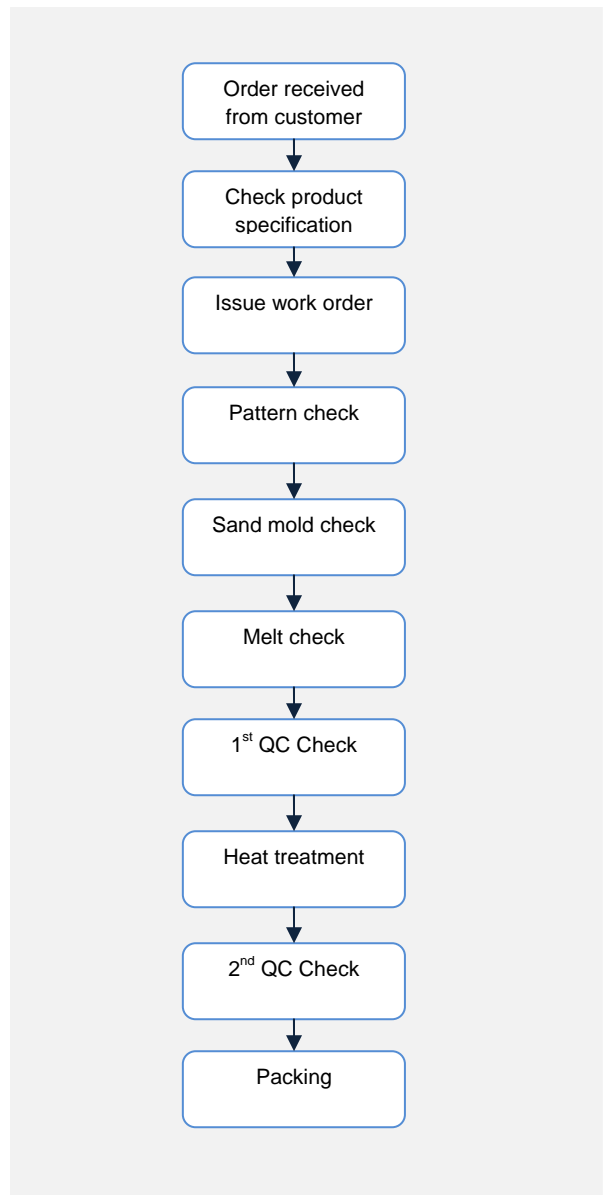


Figure 5, Simplified production process

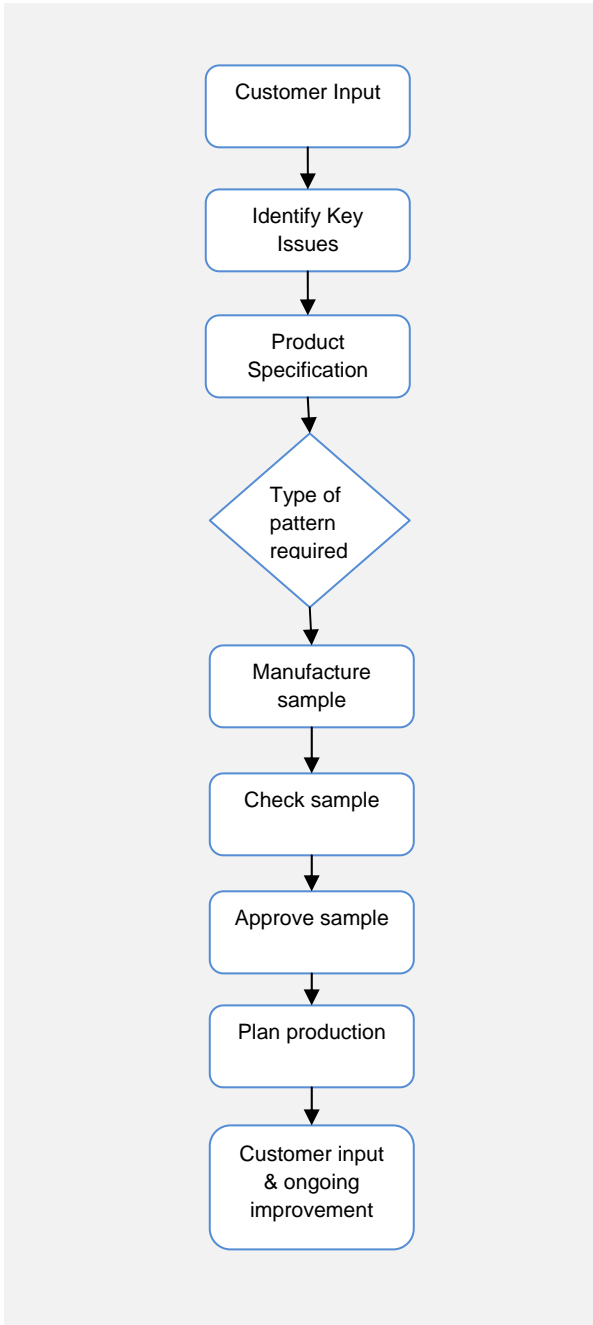


Figure 6, Manufacture a new product

### 8.0 Documentation

The following documents are used in the quality process:

- a. Chemical inspection report
- b. Dimensional layout report

All critical, or as per customer request, parts are traceable by an individual serial number cast or stamped into the product.

Dimension	A	B	C	D	E	F	G	H	I	J
803	227	244	178	238	235	244	238	187	90.5	90.5
804	227	244	178	238	235	244	238	187	90.5	90.5
805	227	244	178	238	235	244	238	187	90.5	90.5
806	227	244	178	238	235	244	238	187	90.5	90.5
807	227	244	178	238	235	244	238	187	90.5	90.5
808	227	244	178	238	235	244	238	187	90.5	90.5
809	227	244	178	238	235	244	238	187	90.5	90.5
810	227	244	178	238	235	244	238	187	90.5	90.5
811	227	244	178	238	235	244	238	187	90.5	90.5
812	227	244	178	238	235	244	238	187	90.5	90.5
813	227	244	178	238	235	244	238	187	90.5	90.5
814	227	244	178	238	235	244	238	187	90.5	90.5
815	227	244	178	238	235	244	238	187	90.5	90.5
816	227	244	178	238	235	244	238	187	90.5	90.5
817	227	244	178	238	235	244	238	187	90.5	90.5
818	227	244	178	238	235	244	238	187	90.5	90.5
819	227	244	178	238	235	244	238	187	90.5	90.5
820	227	244	178	238	235	244	238	187	90.5	90.5
821	227	244	178	238	235	244	238	187	90.5	90.5
822	227	244	178	238	235	244	238	187	90.5	90.5
823	227	244	178	238	235	244	238	187	90.5	90.5
824	227	244	178	238	235	244	238	187	90.5	90.5
825	227	244	178	238	235	244	238	187	90.5	90.5
826	227	244	178	238	235	244	238	187	90.5	90.5
827	227	244	178	238	235	244	238	187	90.5	90.5
828	227	244	178	238	235	244	238	187	90.5	90.5
829	227	244	178	238	235	244	238	187	90.5	90.5
830	227	244	178	238	235	244	238	187	90.5	90.5

Figure 7, Sample of inspection layout report with Yoke serial numbers specified

Chemical Report

#20 #: 4951, Date: Nov 2007, Quantity Shipped: Yoke Y45 - 8263

Report #: 012/07

Dimension	Part No.	Drawing No.	Specification	Mat'l	Invert Test	B/N
Yoke Head w/ft	Y45B	C10C-425.1	AS 4033 52	E		

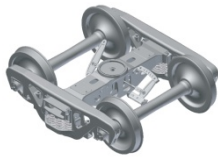
  


BATCH	C.N.	S.N.	M.N.	P.N.	S.N.	C.N.	M.N.	N.N.
15000	Yoke serial # 425, 426, 427, 428, 429, 430							
	0.2806	0.0786	1.0280	0.00177	0.00490	0.32483	0.00895	0.0380
18000	Yoke serial # 431, 432, 433, 434, 435, 436, 437, 438							
	0.2805	0.0840	0.98120	0.00209	0.00346	0.28158	0.04785	0.06930


INSPECTOR: Mr. Uoel Thangma DATE: 08/12/2007


Figure 8, Sample of chemical report specifying batch and Yoke serial numbers for traceability.

## 9.0 Standard products

<b>Bogie Spider Kits</b>	
<ul style="list-style-type: none"> <li>• Standard Gauge</li> <li>• Narrow Gauge</li> </ul>	


<b>Bolster</b>	
<ul style="list-style-type: none"> <li>• Standard Gauge</li> <li>• 70T</li> </ul>	

<b>Bolster</b>	
<ul style="list-style-type: none"> <li>• Narrow Gauge</li> <li>• 70T</li> </ul>	

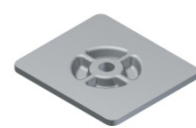
<b>Bolster Side Frames</b>	
<ul style="list-style-type: none"> <li>• 70T</li> </ul>	

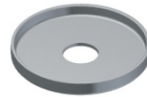
<b>Brake Lever</b>	
<ul style="list-style-type: none"> <li>• 5 X 10</li> <li>• Bushed</li> </ul>	

<b>Brake Lever</b>	
<ul style="list-style-type: none"> <li>• 7 X 14</li> <li>• Bushed</li> </ul>	

<b>Center Cross</b>	
<ul style="list-style-type: none"> <li>• Fabricated</li> </ul>	

<b>Center Spigot</b>	
<ul style="list-style-type: none"> <li>• Cast</li> <li>• Heat-treated</li> </ul>	

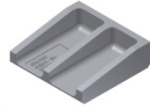
<b>Center Plates</b>	
<ul style="list-style-type: none"> <li>• 12" (300mm)</li> <li>• 14" (350mm)</li> <li>• Bolt holes drilled as an option</li> </ul>	

<b>Cupliners</b>	
<ul style="list-style-type: none"> <li>• 12" (300mm)</li> <li>• 14" (350mm)</li> <li>• 9.5 X 9.5mm</li> <li>• 9.5 X 10.0mm</li> </ul>	

<b>Connecting Rod</b>	
<ul style="list-style-type: none"> <li>• Fabricated</li> <li>• Cast ends</li> </ul>	

### Draftgear Stops

- Supplied as per customer request.



### Drawbars

- Supplied as per customer request.



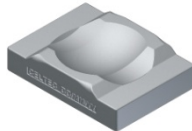
### Towing Devices

- Supplied as per customer request.



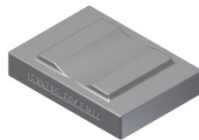
### Followers

- Drawbar end



### Followers

- Coupler end



### Friction Wedges

- As per customer requests.



### Fulcrums

- Supplied as per customer request.



### Fulcrum Brackets

- Left hand
- Right hand

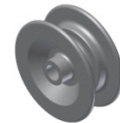


### Keeps

- Various sizes

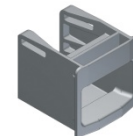


### Sheave Pulley



### Striker Castings

- As required



### Y45 Yokes

- Bushed
- Un-bushed
- Wear Plates

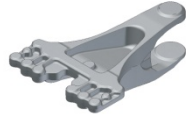


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### Customized castings

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- As per customer requests.



## 10.0 Contact details

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