



Universidade do Porto  
Faculdade de Engenharia  
**FEUP**

Licenciatura em Gestão e Engenharia Industrial

## Relatório de Estágio Curricular *Curricular Internship Report*

### Product Management: Market Study for New Product Introduction (September 2005 - April 2006)

Faculdade de Engenharia da Universidade do Porto



Vulcano Termodomésticos, SA



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FEUP supervisor: Prof. Gaspar Coutinho

Host Company Supervisor: Mr. Hugues Roudiere

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## Executive Summary

This 6-month internship occurred under a protocol between Faculdade de Engenharia da Universidade do Porto (FEUP) and Vulcano Termodomésticos, SA. This agreement made it possible for the student to execute his curricular (and mandatory) internship at the mentioned company.

The internship occurred from 26<sup>th</sup> September to 26<sup>th</sup> March under the title: **Product Management: Market Study for New Product Introduction**. It included solar market analysis in Portugal and Spain (competition analysis, market trends and key factors for success). It was supervised in the host company by Hugues Roudiere, the Head of Department TT/SWH (Product Management Water Heating), and at the university by Prof. Gaspar Coutinho, Marketing Professor at the Degree of Industrial Engineering and Management at FEUP.

The internship had a clear focus on Marketing and Product Management, with aspects of Innovation and New Product Development also involved.

Integration in the corporate world was smooth, consolidated and heavily supported by colleagues.

For this main project, the main aspects I worked with were solar legislation, solar market, competition analysis and product benchmarking.

Other tasks in which I was involved included other market studies, conclusion of the International GWT Catalog, elaborating Product Information files, analysing several product ranges and product lines, benchmarking and competition analysis for other products and markets, ordering and shipping new product samples and supporting the Product Managers.

I found this internship extremely interesting and positive. Some of the most important things I learned during this experience were, for instance, understanding that corporate thinking is different from university thinking, facing complex situations without fear and calmly look for a solution, keeping the focus on objectives, that being social in business is more important than initially thought, that tolerance and respect is fundamental, and last but not least, that the simplest idea is probably the best one.



## Introduction

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While writing this report, I tried to make it as reader-friendly as possible, dividing the chapters and subjects into logical ways. This initial part of the report, for example, goes from the Bosch group overview, passing through the Thermotechnology division, up to Vulcano plant, and then to my Department and myself.

Afterwards, I try to explain some basic concepts about my work, describe how my internship started, developed and concluded, and also to describe with enough detail the tasks I was responsible for. Whenever possible, examples are provided for better understanding. In my opinion, this internship covered almost every aspect of Product Management, as I will try to describe the main tasks and projects I was involved in, numbered from one to seven.

Almost all pictures and diagrams were done by myself, inserted in this document as images (JPG) and are based on data that I worked with.

Quotes and excerpts taken from other sources are written in *italic*.

## I. The Company

### The BOSCH Group, the BOSCH Thermotechnik Division and the creation of *BBT Thermotechnik GmbH*

*Established in 1886 in Stuttgart, Robert Bosch has always been a company that boasts innovation and an unmatched enterprising spirit. From its beginnings as a “Mechanical Precision and Electronics Workshop” to the major multinational group it is today - one of the largest industrial groups in Germany -, it has followed a path of enthusiasm and technological innovation, maintaining a sense of social and ecological responsibility that has resulted in its current success.*

The name Bosch is closely associated with the automotive industry. But Bosch is not just famous for automotive technology products like gasoline, diesel and chassis systems and car electronics. Bosch also supplies many other products and services, including industrial technology, power tools, security solutions and household appliances.

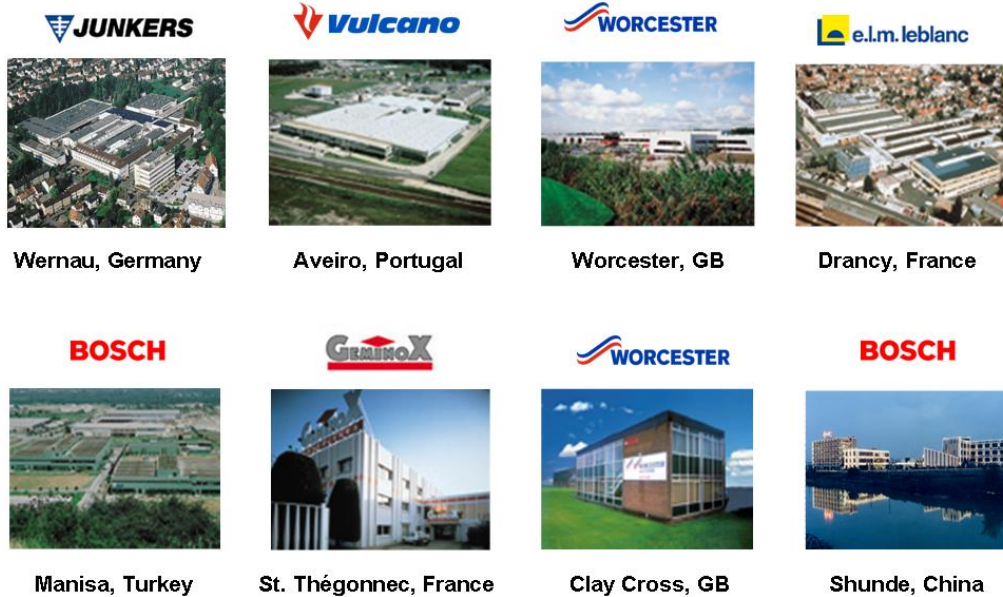
The Bosch Group is divided into 3 main sectors:

- Automotive Technology (the most famous), responsible for Gasoline and Diesel Systems, Chassis Systems, Car Multimedia, Automotive Electronics, Breaking Systems, etc.
- Industrial Technology, including Packaging Technology as well as drive, control and linear motion solutions.
- Consumer Goods and Building Technology, with the Power Tools, Thermotechnik, Household Appliances and Security Systems Divisions.

The start of Bosch Thermotechnology Division occurred in 1932, with the integration of Junkers & Co (founded by Hugo Junkers in 1895) into Robert Bosch GmbH. With 8 factories located in five European countries and some 6500 staff members as at 2002, Bosch Thermotechnik is currently the main European producer of water heaters and gas boilers, as well as an international leader in the sector, responsible for a vast range of products distributed under various brand names.



In the Thermotechnik Division, we can find the Vulcano Termodomésticos, S.A. factory (TTPO), among 8 in total:



*The 8 Bosch Thermotechnik plants worldwide*

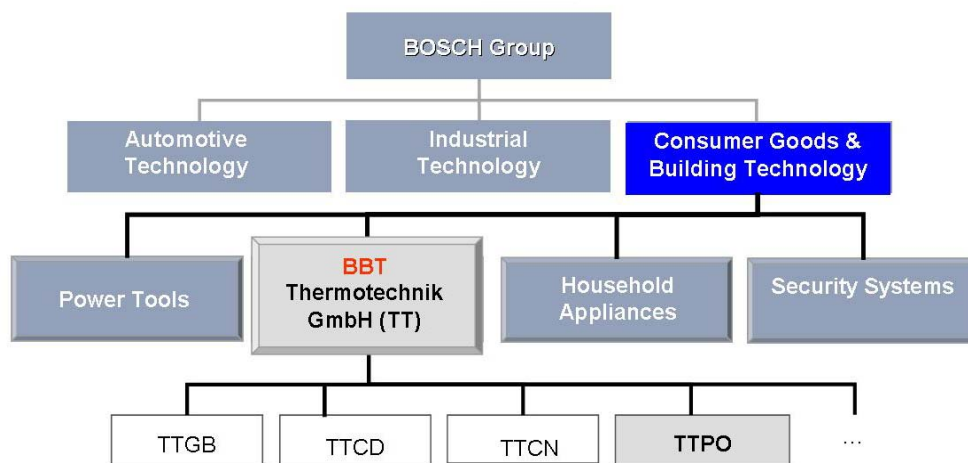
The Bosch Thermotechnik Division has advanced to become one of Europe's top manufacturers of heating units and hot water appliances. The acquisition of Buderus in 2004 provided an excellent supplement to Bosch activities in the heating systems field. This gave origin to the foundation of **BBT Thermotechnik GmbH**, which is a wholly-owned subsidiary of Robert Bosch GmbH. **BBT Thermotechnik GmbH** is a systems supplier whose mission is to provide energy-efficient and environmentally friendly heating and hot water solutions, attaching equal importance both to the responsible use of resources and the flexible and convenient operation of its systems by its customers.



*main and regional brands of BBT Thermotechnik GmbH*

*BBT Thermotechnik GmbH* comprises 11 strong international and regional brands of the Bosch Group. The company has a broad portfolio of products for energy-efficiency and environmental compatibility, from floor-standing and wall-hung heating boilers to solar systems and water heaters. The company employs roughly 12,700 people. 19 production plants in 9 European and Asian countries (8 from Bosch and 11 from Buderus) serve markets all over the world.

**Vulcano Termodomésticos, SA inside *BBT Thermotechnik GmbH***



*Vulcano (TTPO) inside BBT Thermotechnik GmbH*

Vulcano began its operations in Cacia, Aveiro in 1977. Initially consisting entirely of domestic shareholder capital, the company based its operations on a licensing contract signed with Robert Bosch for the transfer of technology used by the German company for Junkers water heaters produced in Germany.

Growth based on the quality of the appliances produced and a clear sales strategy, consolidated in 1983 with the launch of its own brand Vulcano and after-sales assistance, contributed to its rapid and solid leadership in the domestic water heater market. In 1988, with the acquisition of the majority of its shareholder capital by Group Bosch, the Vulcano factory became known as Vulcano Termodomésticos SA and was incorporated into the Bosch Thermotechnik division. Accordingly, existing skills and equipment were

transferred to Portugal, thus initiating a process of specialisation within the Group.

European market leader since 1992 and third largest producer of water heaters in the world, Vulcano Termodomésticos SA is currently designated Robert Bosch's water heater Competence Centre. It is responsible for the product on a worldwide scale, including design and development of new products and its manufacturing and marketing. Benefiting from synergies in the development of gas burning equipment (water heaters), Vulcano Termodomésticos, SA began production of a new model of wall-hung boilers in 1995, which today are an important part of the business.

Now it produces a wide range of models of appliances that carry various brand names in accordance with group policy, the target market and customer marketing strategies. These water heaters and wall-hung gas boilers are sold internationally via primary group brands such as Bosch, Junkers, Vulcano, Worcester, Leblanc, as well as via secondary brands such as Neckar or Zeus, or via own brands produced for clients such as Worten, Ariston and Baxi.

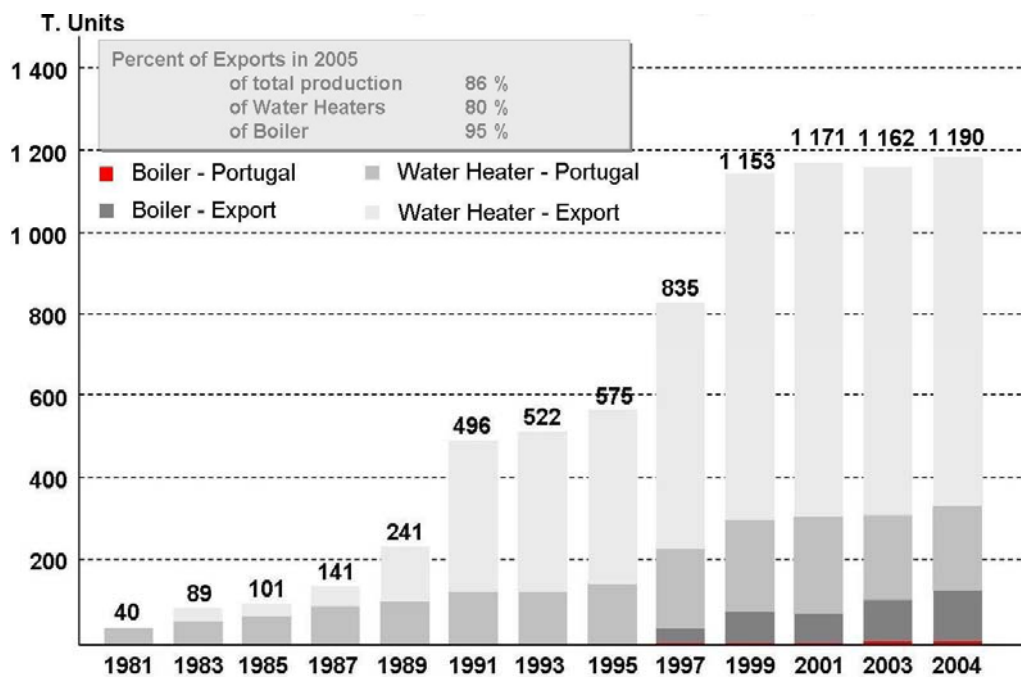
More than 700 models of gas water heaters are produced and geared toward diverse target markets with specific needs. These needs essentially involve a greater comfort index in conjunction with greater cost efficiency and safety standards for the equipment. Vulcano focuses on offering equipment that boasts exclusive features and functionalities classified as USP - Unique Selling Points -, considered worldwide innovations in the water heating market. However, Vulcano's business activity is not restricted to products. Customer service is an ongoing priority as well. Vulcano's activity in this area is two-tiered. One line of action involves an interactive and personalised factory visit program involving the company's existing and potential clients. The other involves providing the best possible after-sales service by developing a partnership policy with Portuguese Companies and Installers, thereby creating the largest and most efficient Technical Assistance network on the market. An ongoing advanced training program provided at the factory also supports this area.

## Vulcano by numbers

- 1 200 employees (around 1 000 in the production area)
- 30 000 m<sup>2</sup> of production area
- Production Data:

	2003	2004
Sales (Mio. EUR)	179	195
% of Sales in Foreign Countries	77	78
Production Capacity		
GWT (T. Units)	1 054	1 088
GZT (T. Units)	105	140
Investment (Mio. EUR)	6.2	7.3
Research and Development (Mio. EUR)	3.2	3.5

*Summarized production data for 2003 and 2004*



*Production volume, diversity and exports volume until 2004 and exports share for 2005*

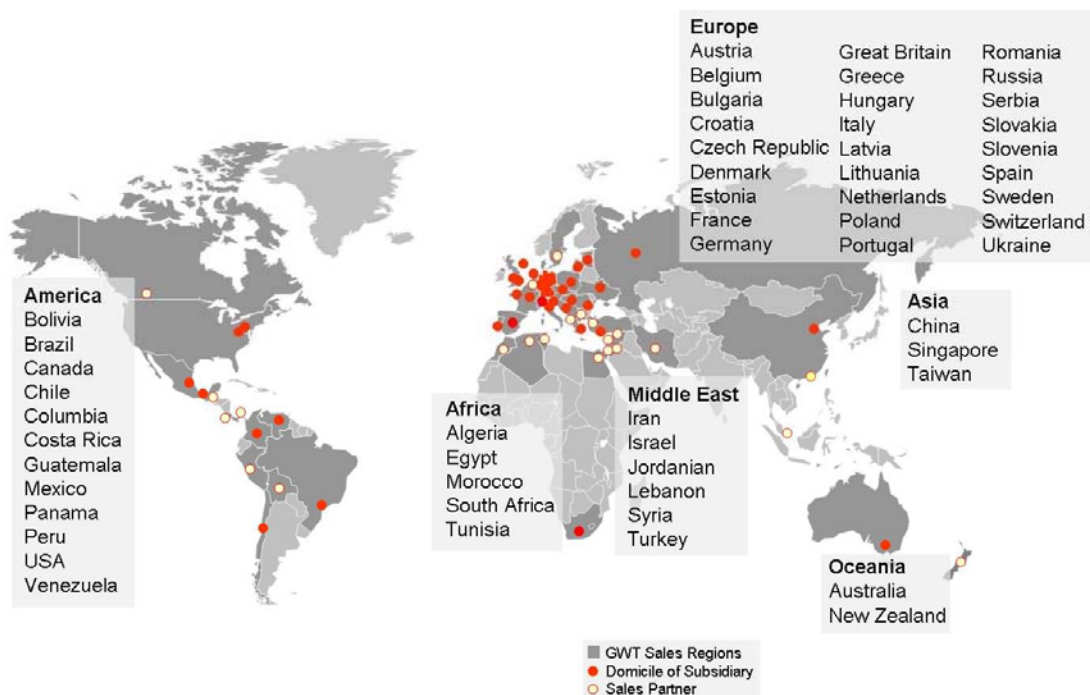
- Product Range GWT (Gas Water Heaters) approx. 700 different models:

Output L/min	Ignition Types	Regulation System	Safety Devices	Exhaust Types
5-6	Manual	Fixed Variable Thermostatic	Oxystop Temperature limiter Flue gas safety Thermocouple	Open Fan assisted Room sealed Balanced
10-12	Manual piezo			
13-14	Electrical 220V			
16-18	Battery			
20	Hydropower			
24				

- Product Range GZT (Boilers) approx. 120 different models:

Output kW	Models	Safety Devices	Exhaust Types
7 - 23 <i>*all electronic ignition</i>	Instantaneous Storage	Temperature Limiter Ion sensor Flue Gas Sensor	Open Fan assisted Room sealed

- Exports and International Markets



*Vulcano Termodomésticos production is exported to more than 50 countries*

Vulcano Termodomésticos, SA products are currently present in more than 50 countries / markets.

- Qualification of Employees:

The topics for training of employees include: Computer software, High school graduation, Languages, Product Training, Quality & Product Reliability (every employee). Vulcano has its own training facilities.

Training in 2004:

- Participation (N):	4 721
- Training Hours (h):	69 506
- Investment (EUR):	919 817

The employees, in general, demonstrate a high level of specialization, flexibility and motivation.

### Vulcano as the Worldwide Warm Water Competence Centre

The creation of a Development unit in 1993 and the resulting transfer of Bosch Group know-how to Portugal was a decisive moment for Vulcano and gave rise to a Competence Centre specialised in water heaters.

The key functions associated to a Competence Centre such as this one are: Product and Design Management, Innovative Development and R&D cooperation (institutes/universities) with focus on sales to over 50 market organizations worldwide, regarding their specific needs and requirements.

Since then, Vulcano has been introducing appliances with exclusive features and functionalities, which were also worldwide innovations. Namely:

- The battery assisted electronic ignition system (1995),
- The HDG - a water heater with automatic ignition using a hydrogenerator (2000), which is a microturbine that generates electrical current when water flows through it, the compact water heater concept (2001) - which allowed the reduction of 27% of volume from traditional water heaters,



- Launch of the Celsius, a roomsealed combustion water heater with remote control and the World One, similar but with higher capacity (24 L/min),
- KME (fan assisted open flue appliances suitable for installations with exhaust problems),
- Combi boilers,
- Unleaded heat exchangers,
- Direct Tapping, which makes it possible to have hot water straight from the appliance, saving maximum of gas and water,
- Polyamide water valves, much lighter than the obsolete brass water valves.

All these projects were conceived in cooperation with external institutions, namely CATIM, INEGI, INOV and suppliers with whom Vulcano maintains crucial partnerships.

As a summary, TTPO responsibility within TT can be seen in the following picture:



*TTPO responsibility for water heating within TT*

## Main highlights of Vulcano history

1886 - Establishment of *Robert Bosch GmbH* in Stuttgart, Germany

1895 - Hugo Junkers founded *Junkers & Co.* in Dessau, Germany

1932 - Integration of *Junkers & Co.* into *Robert Bosch GmbH* and creation of the Bosch Thermotechnology Division

1977 - Foundation of Vulcano Termodomésticos, S.A. in Aveiro, Portugal, and signing of a technology transfer contract with Bosch

1983 - Launch of the brand *Vulcano*



1988 - Acquisition of majority shareholder capital by *Robert Bosch GmbH*

1992 - European leadership in Gas Water Heater production

1993 - Transfer of Development Department to Aveiro

1996 - Start of wall-hung gas boilers production

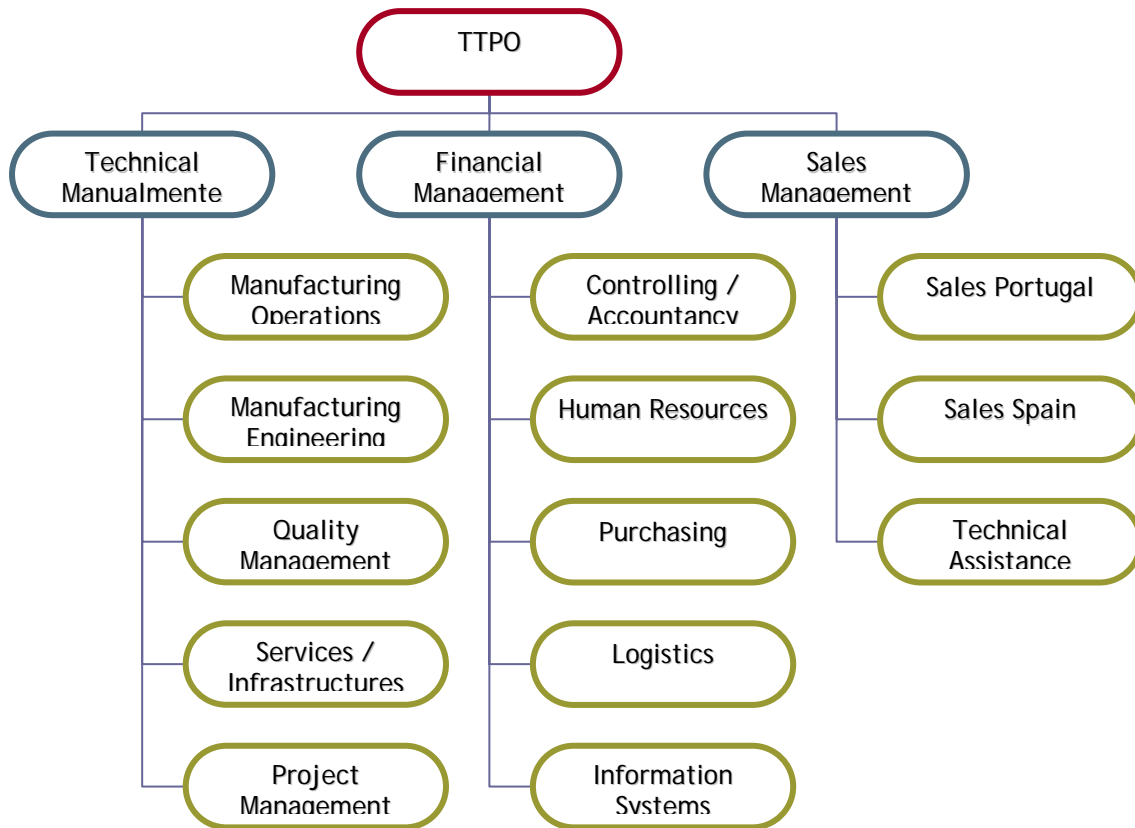
1998 - Creation of Product Management Department and establishment of Competence Centre for Gas Water Heaters in Aveiro

1999 - Production of 1 million Gas Water Heaters / year

2004 - Merger of Thermotechnology division of *Robert Bosch GmbH* and *Buderus Heiztechnik GmbH* to "*BBT Thermotechnik GmbH*"



## TTPO Departments and Structure (simplified version)



*Simplified Organizational Chart of TTPO departments*

### TT Departments which are located in Vulcano, Aveiro:

- Product Management Water Heating (TT/SWH)
- Development Water Heating (TT/EWH)
- Sales International - region 5 (TT/SAI5)

This Department is responsible for Sales Management in region 5: Portugal, Spain, Africa, Latin America and Middle East.

As you can see, TT/SWH is responsible for the customer requirement and representing it in the Time-To-Market process. The next chapter will explain in detail what is the TT/SWH role in BBT.

## The Department

### TT/SWH - Product Management Water Heating

TT/SWH (meaning *Sales Water Heaters*) is responsible for the International Product Management - Gas and Electric Water Heaters. It is located in Aveiro in the heart of the TTPO plant. It's a very central department where all decisions concerning the final product must go through.

Its vision is *“Worldwide leading position in water heating through innovation and profitability”* and its mission is *“Customer satisfaction”*.

TT/SWH has the following main tasks:

- To analyze and understand customer and end-user needs and requirements around the world,
- To identify new business opportunities and define new product concepts and product ranges (programme planning and innovation),
- To represent customers and users in the new product development teams, all along the BBT TTM process and contribute to timely, quality and profitable introduction of new products,
- To manage existing range of Gas and Electric Water Heaters (sales, results, market shares, life cycle management).

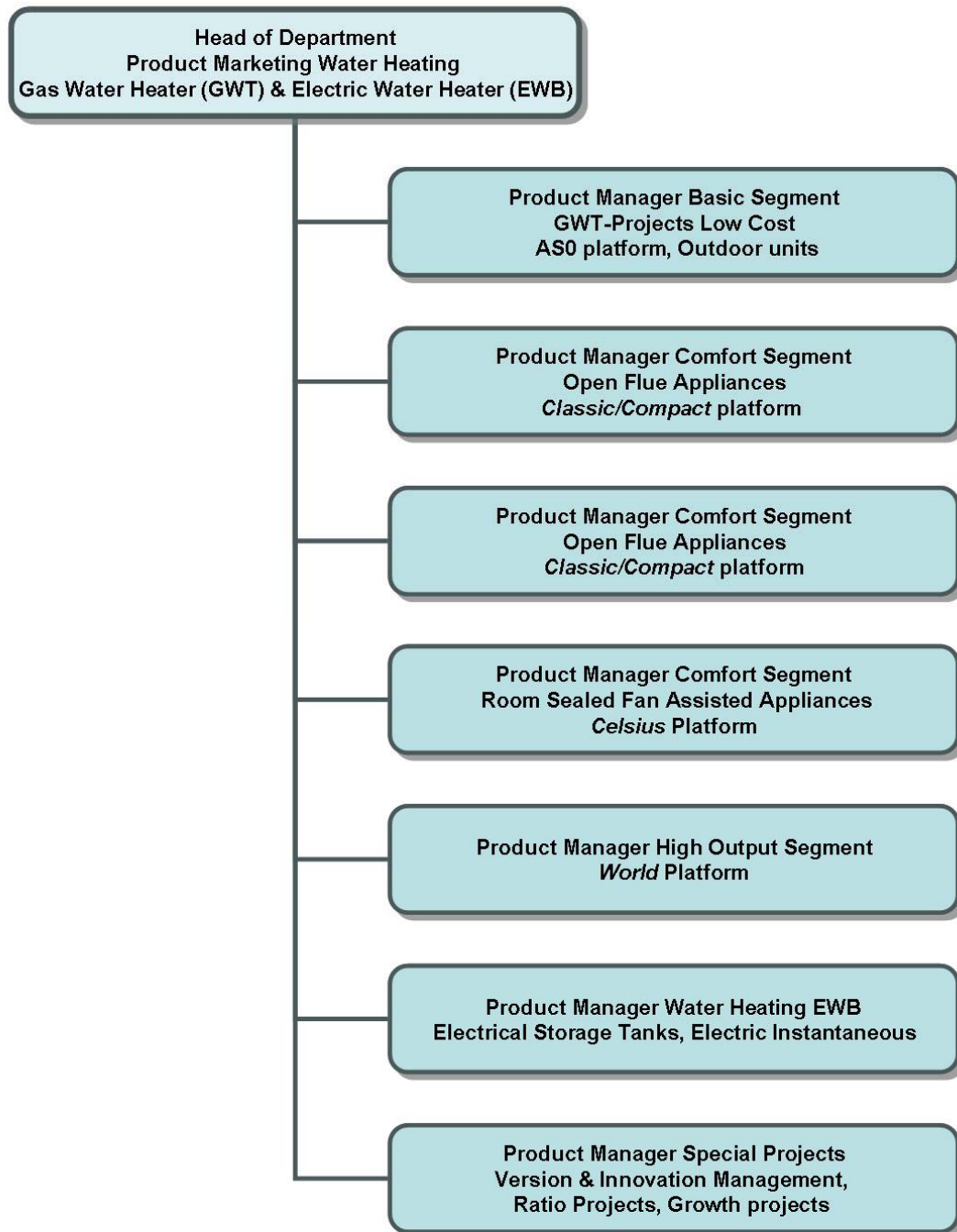
Basically, it's all about listening, learning and responding to the customers and end-users.

Innovation is a fundamental factor for success in Vulcano, and Product Managers are front line agents in this aspect. They are also responsible for elaborating and documenting new product ideas, search for gaps and ways to increase value. This means that they have to be able to foresee changes in market trends in the next years and come up with ideas to meet these trends, along with evaluating, together with Engineering and others, the feasibility and profitability of these new ideas.

Before any product or product range is introduced, it is necessary to know what the market needs and if that is feasible economically and technically. So, first, the market must specify (through a Market Specification) what kind of features or services they need. This document will be analysed by TT/SWH and by the Engineering team - (TT/EWH), and will sometimes be replied with an alternative proposal. This happens when the developer / manufacturer does not find it feasible or cost-effective or when the Product Manager does not find the product suitable for the market, for strategy or profitability reasons.

This amount of iterations can be highly reduced if dialogue and interaction is constant and everything is very well understood from each side before elaborating these documents. The result of this agreement is the so called Product Specification (agreed with the Project Leader), which will then be the main guiding line for the project.

TT/SWH also supports the markets in any issue they may have concerning products that were already introduced. This is called "market focus". For example: change of safety stickers according to local legislation, a new package with improved design, an updated instructions manual, a new feature, a different colour for the front cover, a new accessory that needs to be added., etc. Depending on the complexity of the request, the follow-up would vary from a simple ECR (Engineering Change Request) to a New Product or Country Variant (this applies when we are talking about an existing product that only needs some adjustments to a determined country / market).



*TT/SWH Product Management Organigram*

## The Product Manager (general overview)

The work of a Product Manager goes from creativity to technical know-how, and from the design phase to marketing. His responsibility includes managing the life cycle of a product and to have total control over it, as well as representing the customers along Product Development processes.

In order to create, develop and launch his products, the Product Manager (PM) proceeds in 3 phases:

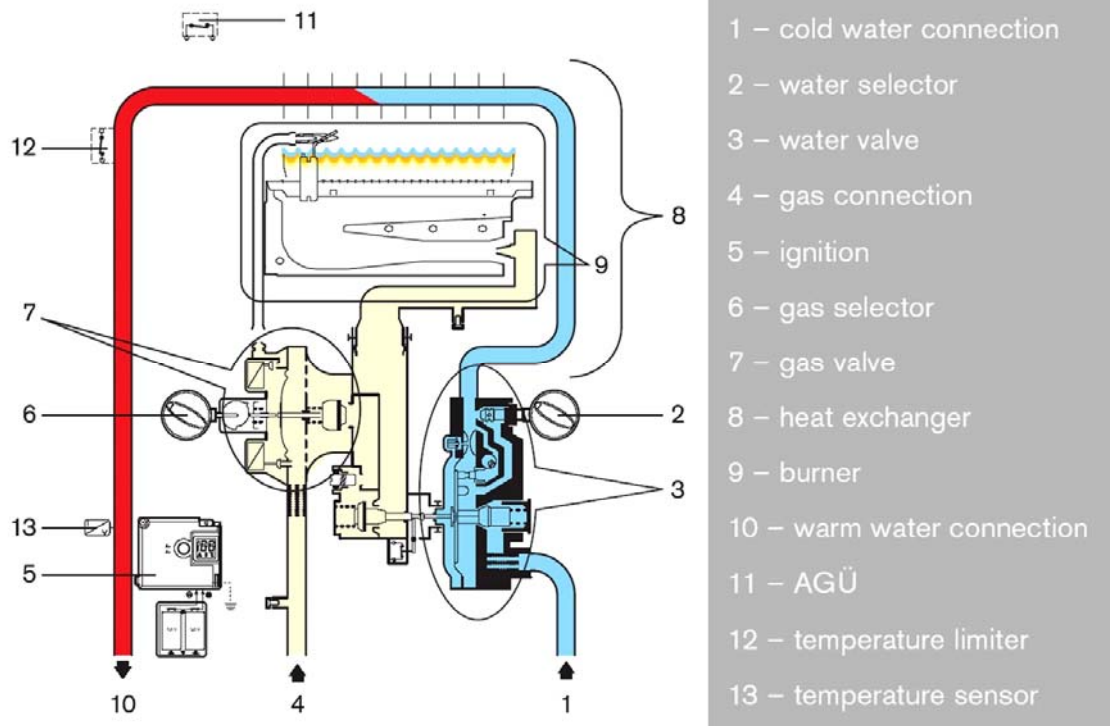
- Market Studies - the PM examines the needs of his markets, analyses competition and follows targeted sectors. He refines his concept by meeting influential customers, attending trade fairs and reading technical documentation. Internally, he consults sales forces and technicians.
- Defining the Product - the PM works with the Sales and Marketing departments and Design offices to prepare the specification sheet and marketing file. He then mobilizes the sales forces to generate the most effective market introduction for the product.
- Managing the Life Cycle - the PM follows his product's performance, the quantity to be produced, sales forecasts, statistics, adjustments of production resources, price policy management, etc. He also has to anticipate the product's evolution, so that it can continuously respond better to market needs. The Product Manager is a «cyber salesperson»: he makes daily use of the web to communicate about his product, promoting it and following evolutions in the market.

A PM should be a “negotiator with a creative personality”. Searching, finding or inventing are part of his daily work. Convinced by the interest and future profitability of his product, he also has to «sell» it internally, persuading his interlocutors that his idea is a good one.

Within the company, the PM fulfils a transversal role because he has to combine creative, technical and commercial skills. All the departments are familiar to him: R&D, Production, Purchasing, Marketing, Sales... Although he benefits from the autonomy needed to perfect his concept, the Product Manager must however adhere to the Group strategy, following the orientations defined by the Marketing Department, obtaining results and reporting on his operations.

## The Products

### How Does a Gas Water Heater (GWT) work?



All Gas Instantaneous Water Heaters work according to the **economic instantaneous flow principle**. As soon as hot water is required, the appliance starts operation by the ignition of the burner (9). It is always possible to choose the amount of water by using the water selector which controls the water valve (3). The cold water is heated up as it circulates through the heat exchanger (8). The latter is supplied by gas which also can be modulated by the gas selector in the gas valve (7). This means hot water is immediately available at any time and in any desired quantity. All appliances are provided with several (standard) security devices, for instance, flue gas safety device, AGÜ (11), temperature limiter (12) or temperature sensor (13) as well as water overpressure protection or flame failure protection. The appliance does not begin operation before hot water is required. There are no standby losses; the appliance saves energy and operates economically. The maximum possible volume of hot water which can be delivered continuously depends on the appliance rating and the desired output temperature.

Water heaters are not the types of consumer goods that can count on quick impulse purchases. They are durable investment goods for private households and industrial companies. This means that they are also dependent on the prior recommendations of installers.

As far as BBT's water heaters go, they are divided in three segments for gas water heaters (Basic, Comfort, High Output) and one for electrical water heaters (also TTPO's responsibility in terms of marketing and new product development)

The **Basic Segment** involves low priced appliances that live up to the BBT Thermotechnik quality and safety standards. By means, chimney appliances for highly price-sensitive markets with basic requirements in hot water comfort. It's a reliable product with an attractive design and it is easy to use. This gas water heater is an affordable solution and can be adjusted to the specific market requirements in order to meet the particular country standards. Water output goes from 5 to 14 litres /minute and installation is easy. However, the lifetime is lower than the other segments (Comfort / high Output). AS0 and Classic 5 L are good examples of this Segment. They are manufactured in the BBT China plant.



*AS0 and Classic 5 L*

The main markets for the Basic Segment are Eastern Europe and South America.

The **Comfort Segment** is divided into two families of products. The Compact Family has been developed and designed to meet the needs of customers requiring an open flue appliance with both high output and compact dimensions when, for instance, the space for installation is limited. With the smallest dimensions in its category, it provides the largest range of output and ignition features in the market, as well as a 100mm height reduction of the Compact appliances when compared to the previous Classic



models. This reduction does not only improve its convenience and serviceability but also contributes to a more efficient exhaustion of flue gases. The top of the Compact range is the 18L model with Hydro Generator ignition (HDG). In this appliance, the ignition spark is produced by a hydrodynamic generator driven by water flow. With the elimination of the permanent pilot flame, the gas consumption can be reduced up to 25% and there is no need for electricity or battery connection. The open flue Compact appliances are the right choice when the exhaustion of the chimney is good. If the draught is insufficient, the solution is the Fan assisted Compact 2 KME which will greatly improve the exhaustion conditions.

Created to meet the consumer's request for convenience, the Celsius Family is the top in terms of comfort and convenience in its category. Celsius Plus guarantees a stable and constant water temperature by means of electronically modulated water and gas valves that automatically adjust the water flow and the amount of gas according to the selected temperature. In addition, these high comfort appliances are equipped with a LCD Display allowing the highest flexibility for temperature selection, by giving the possibility to select the desired temperature in +/- 1°C steps. The LCD enables the control of the temperature setting and provides information about operating mode and warn-of-faults. The Celsius Room Sealed Fan-assisted Gas Water Heaters do not require a house-own chimney connection and therefore represent an easy and flexible solution for all installation conditions with maximum safety. The "Celsius Plus" appliances are featured with a Radio Remote Control, which has been granted the *Red Dot Design Award* in 2004. This allows the changing and memorizing of the water temperature setting from afar, for instance from your bathroom before having a bath or even while taking a shower. It's waterproof, ergonomically shaped and easy to handle both for right and left handed people. It can be used in within a distance up to 30m and 3 floors without interfering with another Celsius appliance. The main markets for the Comfort Segment are Western and Central Europe.



*Compact 2, Celsius Plus and Solar kit*



The **High Output Segment** is represented by a single type of product at the moment. If we combine all the highest comfort standards of “Celsius Plus” with high output while keeping compact and small dimensions, the result is the World One (also called Celsius Plus 24L) - the latest BBT development and ultimate choice in Gas Water Heaters. Developed and designed to meet the needs of high demanding users in terms of water output, this appliance delivers up to 24 liters of water per minute; one can, for instance, run up to 3 showers or 2 showers and 2 sinks at a time. This appliance does not only guarantee the best warm water comfort and convenience but is also featured with a compact premix burner, delivering top of the class efficiency. It is also available as an outdoor version giving even more flexibility for installation. The main market for this appliance is North America.



*World 1*

Electrical Water Heaters are not produced in TTPO. These products are bought from suppliers world-wide, while adapted to Bosch safety, features and design guidelines, and then certified and introduced in our markets under our brands. They are divided in 5 categories:

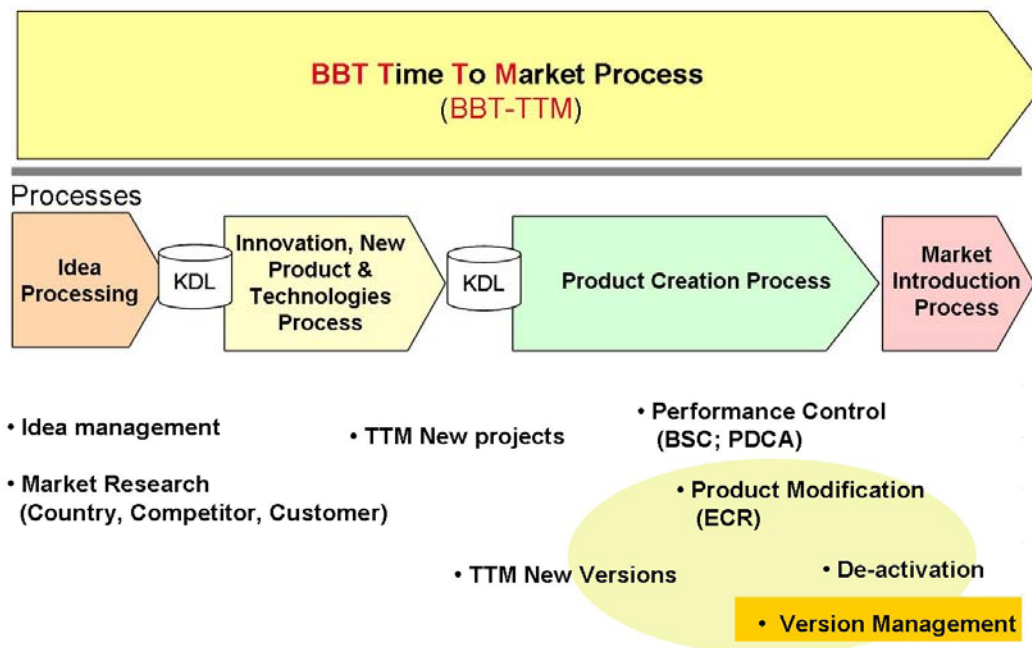
- HS - Storage Tanks for multipoint
- EH - Storage Tanks for multipoint (for the German market)
- EN - Storage Tanks for one point of use
- EHU / O - Storage Tanks for one point of use (lower capacities)
- ED - Electric Instantaneous



*Electrical Water Heaters*

## New Product Development and the BBT-TTM Process

During my internship and while supporting the Product Managers, I also had to deal with project-related tasks, including finding and organizing information, setting up small databases or elaborating the marketing files myself (mainly the *Product Information* file for 10 new products). It was one of the most interesting aspects of my internship and therefore I will discuss briefly some of the basic concepts used while working on a new project at BBT.

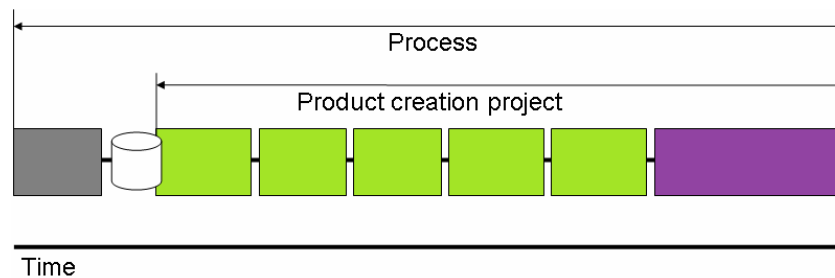


**Time to market (TTM)** is the length of time it takes from a product being conceived until its being available for sale. TTM is important in industries where products are quickly “out-of-fashion”. A common assumption is that TTM matters most for first-of-a kind products, but actually the leader has the luxury of time, while the followers have to race against the clock.

The BBT wide standardized product creation process, based on the Time to Market, aims to deal with projects in all sites according to the same rules and procedures. This should ensure that, throughout BBT, this process will run according to schedule, and the guidelines regarding quality, costs and deadlines are followed successfully.

## Product Creation Process

It is absolutely necessary for a company to define rules and procedures in order to bring the customers' product requirements to market in the required quality, on time and at the best price. Product developments often take a long time and can extend over years. For these complex projects technical and commercial risks are limited by dividing the creation process into defined sections with fixed start and end points and allocating the defined rules and procedures chronologically within the sections (phases).



These sections that are separated chronologically from each other are used to give the rough direction of and specify the location for the product development. Transfers between phases are important, event-orientated decision points (**milestones**) that are of vital importance as turning points for the continuation of product development.

## Project types

The different tasks performed in the form of projects are divided into project types (N, M, R, S). The definitions and minimum requirements for implementation are described in the following table.

	Type	Definition	Backlog	Process	PKDS	Project Start	Project Review
BBT-TTM	<b>N</b> =New	- New market - First launch of a new product in existing market - strategic important project - new product for location	Y	Y	Y	PCMExx	NPC 1, NPC 2 (*)
	<b>M</b> =Modification	- alteration of existing product - country variant - model care	Y	Y	Y reduced	PCMExx	NPC 1, NPC 2 (*) PCM Exx Proj. Cost <50T€
	<b>R</b> =Research, Predevelopment	- no sellable product - feasibility study	Y	tbd	-	PCMExx	-
Series	<b>S</b> =Series Support Ratio, Quality Improvement	no change to form fit or function for customer	-	ECR	ECR	Local Development	-

We can see that not all projects are required to go through the TTM-process, like the S projects. These include quality improvements and minor changes in structure, and for those there is a simpler process for execution called ECR (Engineering Change Request). Any worker can initiate an ECR, if there is enough substance for it.

There is the possibility of combining several requirements of the type "S" project and thus create a type "M" project.

The PKDS (Project Key Data Sheet) contains all the project's key data and describes how the project is progressing within the process. The PKDS is created by Product Management before the project starts and transferred to the Project Manager when the project starts. The items that the Project Manager must constantly update are: Project costs, Product costs, Product quality, Deadlines, Market data.

Project Key Data Sheet Overview										BBT THERMOTECNIK GMBH A Bosch Group Company						
Project No: last Update: 25.11.04					Project Manager: Product Manager:					Status: <span style="background-color: #90EE90;">G</span> Version: 2.0 (30.11.04)						
<b>Product Data</b>					<b>Time Schedule</b>											
Product					Project Start	Project Release	Industrial Design Release	Project Confirm.	Tech. Design Release	Software Release	Fieldtest started	Rel. Zero Series Prod.	SOP Release	Delivery Release	Project End	
Markets					Initial planning at project release [dd.mm.yy]											
Brands					planning at project confirmation [dd.mm.yy]											
USP					actual planning done [dd.mm.yy]	-	-	-	-	-	-	-	-	-	-	
Characteristics of product					Review Team	PCM	PL	TT/MK	NPC 2	PL	R&D	PL	PL	xxP/PM	NPC 2	PCM
strategic objectives					<b>Profitability</b>											
					4 Years: 1900 - 1904			Confirmation		Current phase		delta				
					Market volume (Tsd. Pcs.), 4 Years Sum											
					Volume TT (Tsd. Pcs.), 4 Years Sum											
					Turnover ex. TT (Mio €), 4 Years Sum											
					Discounted cash-flow (Mio €)											
					Pay back period (Year) from first payment on											
					FOM (only for self produced products)											
					DB1 in % of turnover, 4 Years											
					DB3 in % of turnover, 4 Years											
					DB5 consolidated in % of turnover, 4 Years											
<b>Product Cost [PHEK] in € / pcs. lead type</b>					<b>Project Cost (T€)</b> [Development personnel cost + external cost + MAE + E/WAK]					<b>Quality</b> (number of QA tasks)						
<div> <div style="width: 100%;"></div> <div> <span style="background-color: #cccccc;">actual PHEK</span> <span style="color: red;">— Target-PHEK</span> </div> </div>					<div> <div style="width: 100%;"></div> <div> <span style="background-color: #cccccc;">actual PHEK</span> <span style="color: red;">— Target-PHEK</span> </div> </div>					<div> <div style="width: 100%;"></div> <div> <span style="background-color: #cccccc;">actual PHEK</span> <span style="color: red;">— Target-PHEK</span> </div> </div>						
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The PKDS has two functions:

- For the Project Manager, it is a project planning and project monitoring tool.
- It is used by the review team to monitor project progress (Target/actual comparison). It must be submitted by the Project Manager at the relevant meetings.

The Work Packages (WPs) to be completed for each phase in the process are listed in the WPL (**Work Package List**). At the start of the project the Project Manager and his team select the work packages that are relevant for his project from the WPL. The Project Manager uses the WPL as a basis for planning, managing and controlling each phase and it must be updated each week.

The **Milestone Release Criteria (MRC)** is automatically filled in by entering the dates for completion. The MRC is the basis for indicating the milestones in accordance with the relevant approval rules.

**Lessons Learned** are used by Project Managers to exchange experiences and are a fundamental component of a learning organization. To do this they must be asked firstly for experiences from other comparable projects at regular intervals and, secondly, information on these experiences should be made available for other Project Managers for their own projects.

This information (on which procedures lead to success in the project) should be exchanged as well as information which provides possible sources of error and problems.

The **Quality Assessment (QA)** is used to carry out a verification and to indicate risks in the project at an early stage and to take measures at the right time. Up to 5 QA's (QA-0 to QA-4) may be carried out during the project.

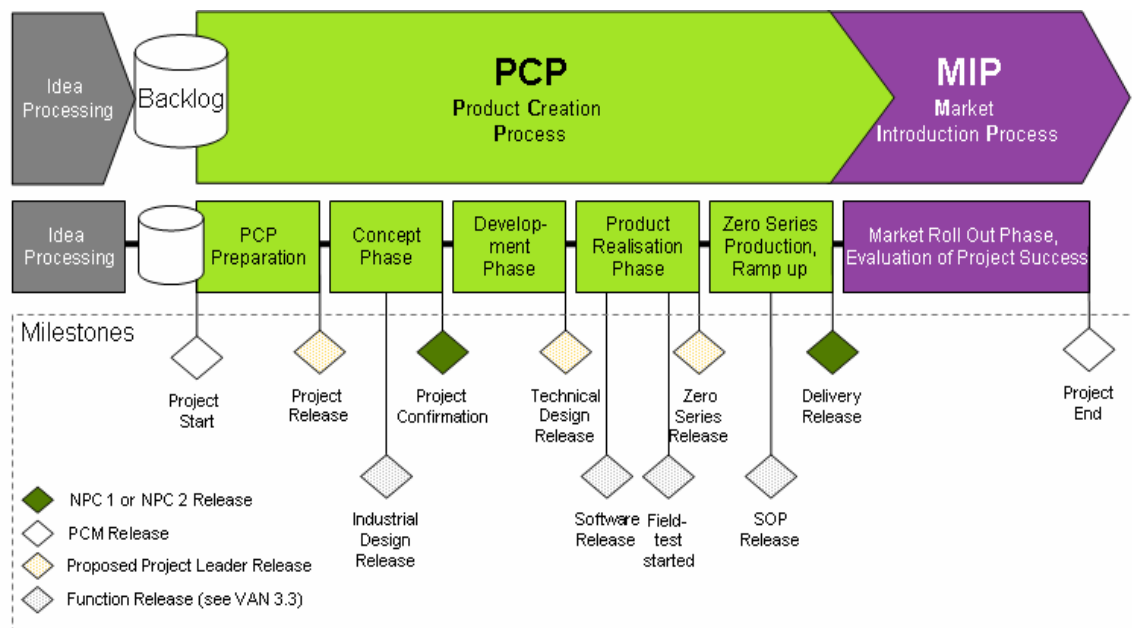
A pre-requisite for completing the project and for the Project Manager to hand over responsibility for the product to the relevant Product Manager is the release of a result of QA-4 or a final cost effectiveness study of the project in the Project End Review.

The **Failure Mode Effect Analysis (FMEA)** is used to detect and avoid errors in a product. It includes three areas of use (System FMEA; Construction FMEA; Process FMEA)

All new parts for a project are listed in the **New Parts Matrix (NPM)** and filled in with information on all the functions during the project so that a report on the status of new parts can be given at any time in a project. Overall function information includes (General information, Development data, Purchasing data, Costs, Tool data, Quality data, Production data, Data on creating samples)

### Process description

The TTM process is divided into separate phases. There are defined milestones within and at the end of phases. Milestones are important approvals with deadlines. These approvals are requirements for release to the next phase.



**Idea processing** - describes the work steps from the systematic collection of information up to the approval of a project. Important information (e.g. market information, performance of existing equipment, information on competitors, new technologies, new suppliers or innovations from existing suppliers, new production techniques etc.) are collected by all BBT departments. The information is systematically recorded and analyzed. The analysis of this information and the use of innovation workshops or innovation teams leads to the creation of new product ideas.

The first recorded step in the process is to write a document on the provisional product design based on the idea, called "Project Idea

Description" (PID). This document should present the idea from the point of view of customer benefit. The idea will be checked to see whether it complies with the BBT strategy. The idea must be entered in the back log by product management before it can go through the next process. This backlog is the Key Development List (KDL), a database in which all ideas are stored. Projects are then started from this database by the appropriate review committee.

**Project Start** - permission is given for the project to start by the appropriate review committee at the Project Co-ordination Meeting.

**PCP Preparation** - the general feasibility of an idea must be clarified as part of the "PCP preparation phase" of the TTM process. Various design versions must be displayed and evaluated for the technical implementation of the idea from the "Idea processing" phase.

**Concept Phase** - the aim of this phase is to produce an agreed specification and a detailed project plan (resources, work package list, project key data sheet, schedule etc.) as a basis for confirming the project at the end of the phase. The industrial design is determined including the creation, testing and evaluation of an A-sample. Schedules for approval, creating samples, test procedures and market introduction are worked out. The project is confirmed and approved for the next phase by the relevant review team.

**Development Phase** - the aim of the development phase is to construct a working, tried and tested, positively evaluated B sample. Replacement parts and characteristics of documents requiring archiving and risk parts are defined based on this B-sample and suppliers for purchased parts determined. The first field test unit is installed. Technical development progresses at the same time as market preparation activities in the form of logistics, marketing and training planning. The review team defined at the start of the project releases the product for the "Product realization" phase.



**Product Realization Phase** - the aim of this phase is to prepare the organization for the new product. In Production new production processes are planned and the necessary new investment made. Price positioning and product information are worked out. The first training sessions are held. Action to be taken from the B-sample evaluation are incorporated into the C sample. The software is released when it has been approved. The field test is started with the C-sample. Ordering the necessary material for the "ramp up". The review team defined at the start of the project grants approval for the "Zero series production" phase.

**Zero Series Production, Ramp up** - in the "Zero Series Production" phase the new product is produced in Production as a zero series. External training sessions and customer presentations are held. Completion of the technical product documentation and the start of getting rid of stocks of old products. Start of Production (SOP) is approved if the zero series has been positively assessed and all materials are available. The management approves suppliers for the positive completion of this phase.

**Market Roll out Phase** describes the first few months that the new products are introduced onto the market.

**Project End Review** - it completes the project. After this responsibility for the product is transferred from the Project Manager to the Product Manager. Depending on the product at project confirmation this phase lasts between 6 and 12 months.



## II. The Internship

### Internship Plan

After a discussion with Mr. Roudiere, my company supervisor, it was agreed that my working time would be distributed the following way:

- First week to have the transition between the previous trainee and myself.
- Initial training and introducing the department
- 50% of daily time working on the main project
- 50% of daily time doing other sort of tasks for the department, including support to the Product Managers

For the main project, my main supporter was Mr. Michael Glummert, responsible Product Manager for the Solar Kit.

### Internship development

During the first week, the Human Resources Department (TTPO/PER) provided all the necessary support. Namely, the so-called “initial training”, which consists of 3 days of lectures, visits and role-playing activities. This helps to understand the Group, the Company and what is expected from the employees. Manufacturing, Quality, Safety at Work and Environment were the main aspects covered, as well as our rights and duties. At the end, I was taken to my Department (Product Management Water Heating) to meet my director and supervisor, and also to meet my fellow co-workers.

A small interview with each one of these followed. I spent around 30 minutes talking with each Product Manager about his / her tasks and products he / she is responsible for. My director and supervisor, Mr. Roudiere, welcomed me in the best way and was very helpful during my integration in the team, providing good guidance.

It took me 1 to 2 months to adapt to the Bosch Group language and getting familiar with BBT products. Like many that work in Vulcano, I also didn't know anything about water heating or how a water heater works before coming here. It's known that most of us just turn it on and get hot water, without really questioning more.

It is a different reality compared to University life. Soon one realises that it's not so much what you learned during your Degree, but how you find the information you need and deal with it that is important. And, of course, studying the topics and solving exercises forces you to find solutions and getting better at it, and the same applies to corporate life.

Many times I was faced with hard situations that didn't require any specific skill from my degree. Most of them were solved through common sense or general knowledge. There was also some physical work involved related to Department activity. All of this is normal and one has to be proactive, communicative and sometimes very calm in order to approach these situations from a positive side. This is something that is only learned in an internship. To be interested in what you do from a wider point of view, and not just that of your workstation, is a necessary and fundamental requirement of today's world.

Although I was focused on a main project, most of my working time was spent providing support for the Product Managers: participating in benchmarking activities, documenting information, building up short databases, doing research, analyzing competition, studying market needs, legislation and suitability of product ranges, preparing presentations for wider distribution, ordering, shipping product samples for customers, etc. All of this helped me to get a full understanding of their activity and realizing how important it is in New Product Development.

Among the courses and training possibilities that Vulcano has to offer, I decided to participate in one called "Domestic Hot Water for Installers" that took place during November 2005 in Robert Bosch Portugal, Lisbon. It's mainly destined for installers but it's a good opportunity to learn the basics of water heating. It was a one-day event in which almost every aspect was approached, and in which I learned a lot.

TT/SWH has a great working atmosphere. It's driven by projects, ideas, creativity, innovation, coordination, information, communication and management of all of these aspects. I felt very motivated the entire time and did my best to help my team while I was also learning from them.

Going to professional meetings is an important insight for a trainee who has never been in any before. I participated in many for several issues, including the monthly department meeting which was very useful for follow-

up of everyone's projects, for solving problems and for deciding on next steps for the future. Here are some of the meetings I attended:

- Monthly department meetings (all TT/SWH participate)
- OPL (Open Points List) with US market: phone conference of 3 hours (4 participants).
- Meetings with Suppliers for several specific external services for TT/SWH (2 participants + suppliers).
- New Project meetings (8 or more participants)
- Customer welcoming and product range presentation (3 participants + customers from Colombia)
- Error codes and Diagnostics for new product (3 participants)
- Brainstorming session for ideas to promote the new Solar Kit (8 participants)
- Representing TT/SWH while organizing Visits to Technical Assistance Points throughout Portugal and Spain.
- Benchmarking activities
- Several meetings with Engineering regarding product feasibility

### **Internship Conclusion**

As expected, there were deviances from this original plan. Since the main tasks of the internship project were concluded a bit earlier than expected, I was given the opportunity to participate in further activities within the department. Some of the most important ones will also be described in this report. In overall I was well received, well integrated and well supported.

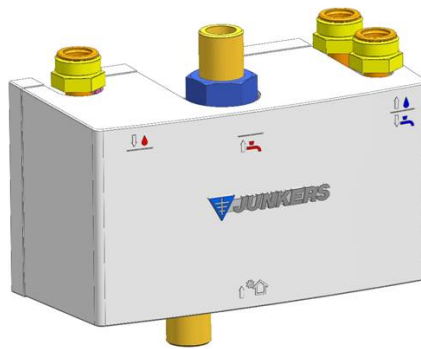
My working station had good conditions. I had my own desk with my own computer and had access to everything I required to do my work, and I always felt as part of the team.

## One: The Main Project

### Market Study for New Product Introduction:

#### - Solar market analysis in Portugal and Spain (competition analysis, market trends and key factors for success).

This internship project was part of the introduction of the new solar kit from BBT. During the time I worked in Vulcano I could follow the project closely.



*Solar Kit prototype*

The idea for this kind of product arose from certain needs of markets where solar usage is significantly installed. At this point, a GWT (except Room Sealed Fan Assisted - RSF type) could not be used in combination with solar applications. This is because the appliance would get damaged due to high water temperatures at the inlet, and also due to the lack of a thermostatic function, which would increase the risk of scalding the user.

In addition to this, there is a notorious growing importance for solar solutions in the markets and, so far, our competitors have shown either very basic or expensive solutions compared to the customer benefit.

This project will be presented in the following way:

- Solar Market and Legislation overview, Sales Forecast
- Solar kit working principle
- Competition analysis
- BBT's solar kit product information

## Solar Market:

Since it is known that the spanish market is more ambitious and advanced in terms of solar use legislation, I have placed more focus on it. I will show some relevant data about the Spanish Heat and Solar market, namely Housing and Construction, Heating Park, Legislation, Brands and Products, Market shares, etc. The main sources I used were reports from Consulting agencies, internal market information and Internet research.

So, reffering to the Spanish market:

- *Housing Stock (2001):*

14,270,656 (69%) primary residences  
 3,323,127 (16%) secondary homes

- *New Constructions (Starts and Completions) (T units):*

	2003	2004	2005	2006*
Starts	622	550	520	500
% change	14.5	-6.7	-5.5	-3.8
Completions	506	600	580	550
% change	-2.6	+18.5	-3.3	-5.2

\*forecast

In 2006 there will be 17,6 million occupied dwellings (1st and 2nd homes).

- *Primary Energy used by Source (2000-2003):*

	2000	2001	2002	2003
Main Source	96.4%	96.2%	96.1%	96.0%
Renewable	3.6%	3.8%	3.9%	4.0%

- *Final Energy used by Source (2000-2003):*

	2000	2001	2002	2003
Main Source	100.0%	96.2%	96.2%	96.4%
Renewable	0.0%	3.8%	3.8%	3.6%

- About Central Heating:

- 47% of primary residences have some form of central heating
- 37% use autonomous central heating
- 10% use collective central heating

- About Water Heating:

- 98.5% of dwellings in Spain have hot water (6.3% getting their hot water from collective systems).

Demand can be rapidly described as followed:

- the installer sector is very fragmented, aprox. 300 large installers, but most of them are very small;
- some of the larger installers are integrated with the construction companies;
- main ones are members of CNI (CONFEDERACION ESPANOLA DE INSTALADORES Y MANTENEDORES)

The largest installers in the market are:

- SIERRA INSTALACIONES
- DELTA ASISTENCIA
- HOGAR DEL GAS
- SYSTEM GAS
- THERMAGAS
- REMICA/REMIGAS
- CECOBA
- SERVICIOS GASISTAS

Design-wise, for new heating systems with an output of more than 60 kW, a project design ("*proyecto de instalación de calefacción*") is required (one for the installation of the gas and one for the installation of the heating systems).

These "proyectos" are normally done by "*ingenieros industriales*" who are specialised in gas and heating systems. There are aprox. 127 individuals qualified in air conditioning, industrial refrigeration and heating). Many are involved in instalation as well as the project work.

- There are 3 or 4 national maintenance companies working with white goods and water heaters, but none working with central heating systems.
- About trends in the solar market in Spain, we can easily conclude that it's a privileged country and with high potential for solar energy, but penetration of solar technologies has been small. The new legislation and expected change of behaviour is bound to make a difference.

Solar Collectors forecasts:

- In 2004 (m2): 752 000
- In 2005-2008 (m2): 124 000 + 149 000 + 249 000 + 348 000 = 870 000

**Total : 1 449 000 m2 of solar collectors by 2008**

Storage Tanks forecasts:

- In 2004: 203 000 pieces
- In 2005-2008: 424 000 pieces

**Total: 627 000 storage tanks by 2008**

All of this confirms good prospects for our goal and proves that investing on solar-related products is a must in the coming years. On the following picture, one can see that BBT is a leader in GWT in Spain, so it has a clear advantage when introducing new products that can be used together with its appliances.

## Market Shares GWT - Spain



Fig 5.3-2 SPAIN: ESTIMATED MARKET SHARES FOR WATER HEATERS: GAS INSTANTANEOUS 2004 AND 2003

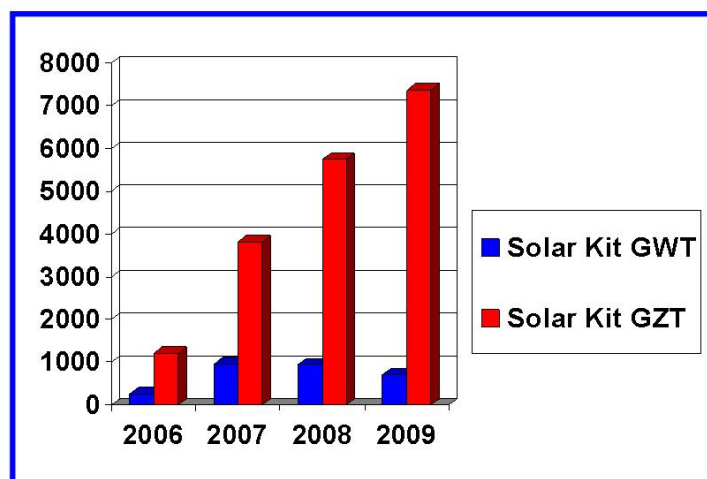
Holding group	Company/Brand	2004		2003	
		No of pieces	Share	No of pieces	Share
BOSCH	JUNKERS	325 000	45.2%	333 000	45.2%
MCC	FAGOR	198 000	27.5%	202 000	27.4%
COINTRA	COINTRA	104 000	14.5%	110 000	14.9%
VAILLANT GROUP	VAILLANT	40 000	5.6%	39 000	5.3%
VAILLANT GROUP	SAUNIER DUVAL	32 500	4.5%	33 000	4.5%
RIELLO	BERETTA	7 400	1.0%	7 700	1.0%
MTS	CHAFFOTEAUX ET MAURY	6 700	0.9%	8 000	1.1%
	Others	5 400	0.8%	3 300	0.4%
	<b>Total</b>	<b>719 000</b>	<b>100%</b>	<b>736 000</b>	<b>100%</b>

Source : GB Consult

Market shares in GWT Spanish market - 2004

Here are the sales forecast for the BBT's solar kit in Spain, in case we would have two products: solar kit for GWT and solar kit for GZT (boilers):

## Sales Forecast – solar kit (units) Spain



Sales Forecast up to 2009 in two types of solar kits - Spanish market



### Legislation:

About Legislation, here are the relevant points in Spain, that create a new opportunity to develop and introduce solar-related products:

- Focus on Safety rather than Environment;
- New regulations are slowly coming to cover flues and control waste gas emissions;
- Legislation and standards on heating exist at the level of: National law + Autonomous regions law + EU Directives + UNE Standards.

The two most significant pieces of national legislation are:

- *Real Decreto 1618/1980* (+ revisions) on heating, air conditioning and water heating installation
- *Real Decreto 1853/1993* on the installation of gas in domestic, institutional and commercial premises.

And the New Plan de Fomento, established at national level, as opposed to regionally as is normally the case. This plan's most interesting points are:

In 2010:

- 12% of renewable energy in Total Demand (double the current share)
- 30% electricity consumption through renewables.

This is considered to be a very ambitious project, if you take into account the high consumption of energy by 2010, therefore the renewable energies usage growth would have to be much higher than originally forecast. This is a big challenge for Spain.

For example, we mentioned before that there would be around 1,449,000 m<sup>2</sup> of solar panels by 2008. So, in order to reach the *Plan de Fomento* goal (4.8 million m<sup>2</sup> of solar panels installed by 2010, or 1.2 million installations), the solar collector market has to grow an average of 1 million m<sup>2</sup> / year.

As final notes:

- In 2005, local regulations stipulates that all new construction buildings are obligated to use Solar Thermal.

- There are incentives available for who wishes to purchase solar panels, like for example, IDEA (Instituto para la Diversificación y Ahorro de la Energía), which subsidises installations of Solar Thermal in Spain (30% of total cost). In 2004 there were € 13.3 million granted. And ICO (Instituto de Crédito Oficial) loans the remaining 70%. In 2004 there were € 25 million loaned.

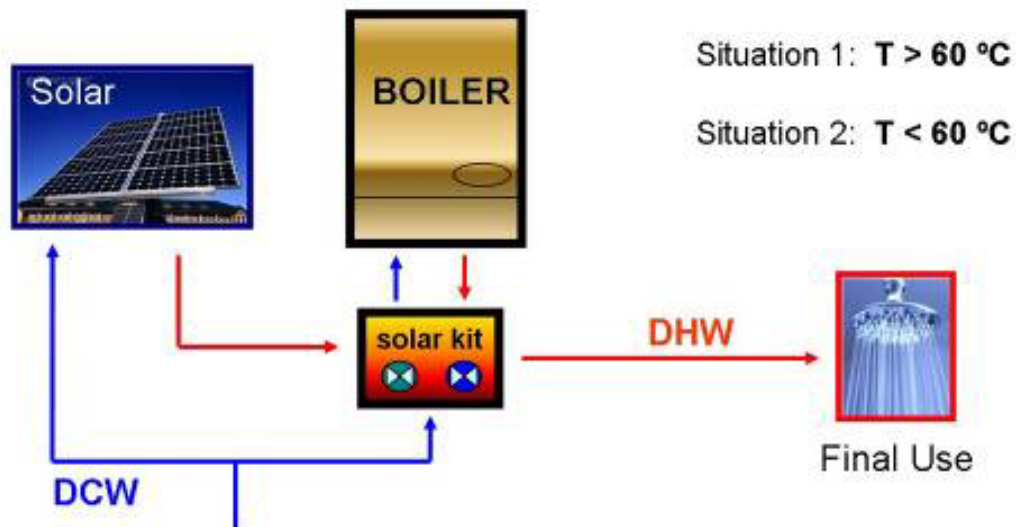
## Solar Kit working principle

And as far as BBT's products go, GZT (Boilers) and GWT RSF (Water Heater Room Sealed Fan Assisted) appliances, when connected to a solar tank, show unstable temperature behaviour and high temperature peaks. Also, the reason for this is that there is no mixing valve included in the appliance and the On / Off cycles are more frequent due to the automatic safety shut-off of these appliances, which causes higher energy costs.

BBT, wanting to lead in innovation in water heating, needs to be in play. But in this case (and in most of cases) it's not enough to participate. It's necessary to innovate and develop Unique Selling Points (USP)<sup>1</sup>.

Before mentioning the competition, I would like to shortly explain the the first idea for the basic working principle, for the new BBT solar kit.

## Basic Working Principle



*Basic working principle of the new BBT solar kit*

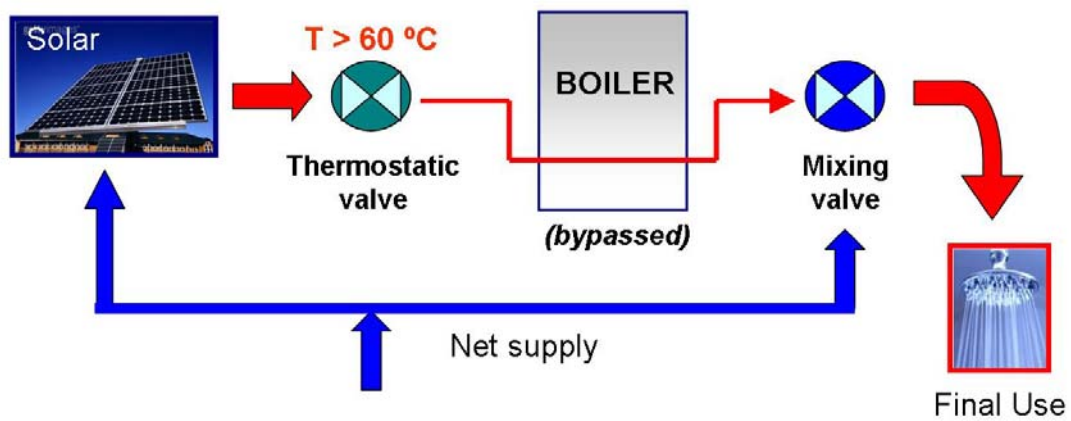
If the temperature of the solar preheated Domestic Hot Water (DHW) exceeds, for example,  $60^{\circ}\text{C}$  (preset by user), the appliance won't heat the DHW any further (situation 1). Moreover, DHW shall not run on higher temperatures than  $60^{\circ}\text{C}$  in order to avoid both calcification and scalding (burning) of the end user. For this to be prevented, Domestic Cold Water

<sup>1</sup> USP (Unique Selling Point) is a product feature that is unique in the market

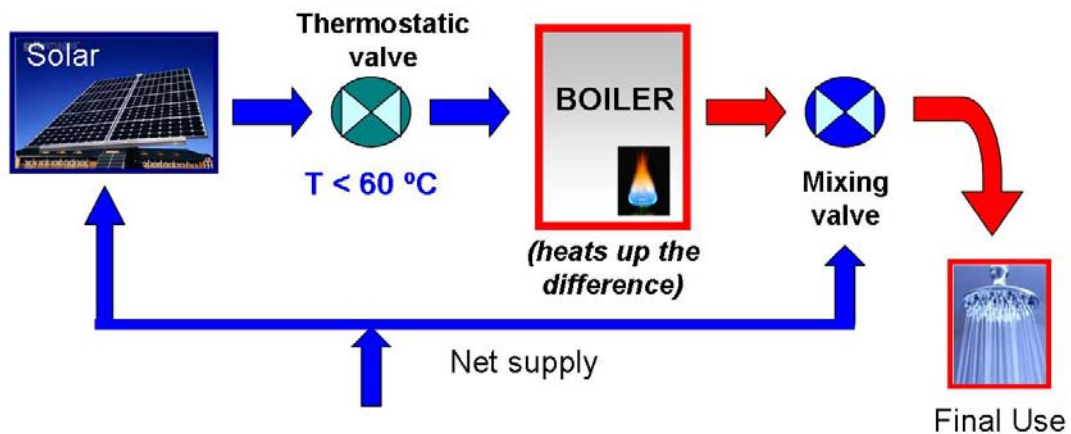
(DCW) must be let in into a three-way valve to ensure that preheated DHW is be mixed to produce acceptable temperatures. With less than 60°C coming from the thermosyphon collector (solar source) the appliance understandably should start supporting the production of DHW (situation 2).

In detail, the following pictures show what should happen in situations 1 and 2:

### Situation 1 – Temperature higher than Demand









### Situation 2 – Temperature below Demand



*First drafts - Description of situations 1 and 2*

## Competition Analysis:


Here are the main brands that compete with a solar kit type of product in Spain:

 Saunier Duval	<b>Saunier Duval</b>
 FAGOR	<b>Fagor</b>
 Vaillant	<b>Vaillant</b>
 Roca	<b>Roca</b>
 Ferroli	<b>Férroli</b>
 HEIZUNGSSYSTEME MANAUT	<b>Manaut</b>

Each one presents a valid solution, which will be explained in the next pages, without entering too much in technical aspects.


- Saunier Duval

## Saunier Duval

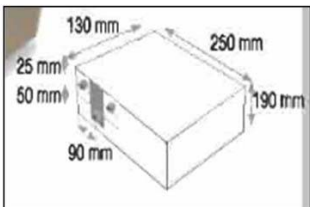


Saunier Duval

**“Kit Solar”**



1 Válvula mezcladora  
2 Sensores de temperatura  
3 Actuador  
4 Circuito electrónico



**How it works:**

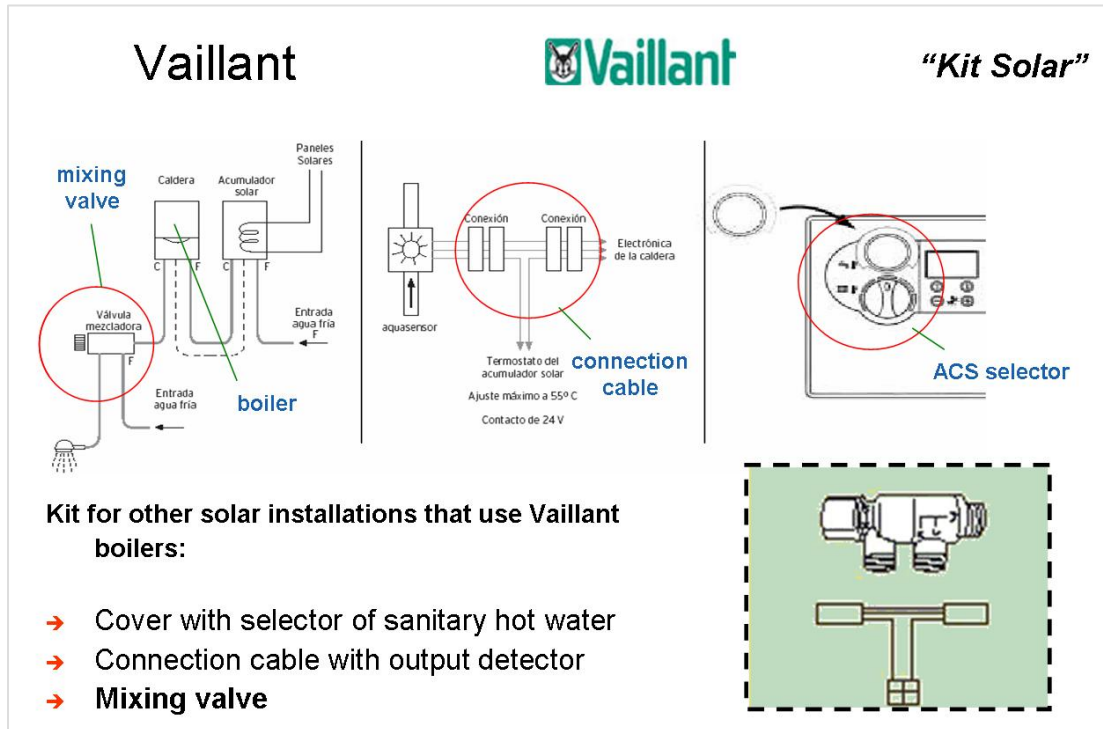
- a **sensor** measures the temperature of water coming from solar
- the **circuit** actuates on the **mixing valve** according to the required temperature from the boiler
- a **sensor** measures the temperature of the water that leaves the kit to the boiler
- the **circuit** sends this info to the boiler circuit
- only if necessary, the water will be heated according to the required temperature

*Saunier Duval solar kit: working principle*

- Fagor

Fagor's solution is merely a mixing valve, not a kit, but still a competitor.

- Vaillant



*Vaillant's "solar kit", basically also just a mixing valve*

For GZT, Vaillant proposes a solar kit, mixing hot water before consumption. In commercial leaflet, they advise about problems for GZT when receiving water at temperatures higher than 75°C.

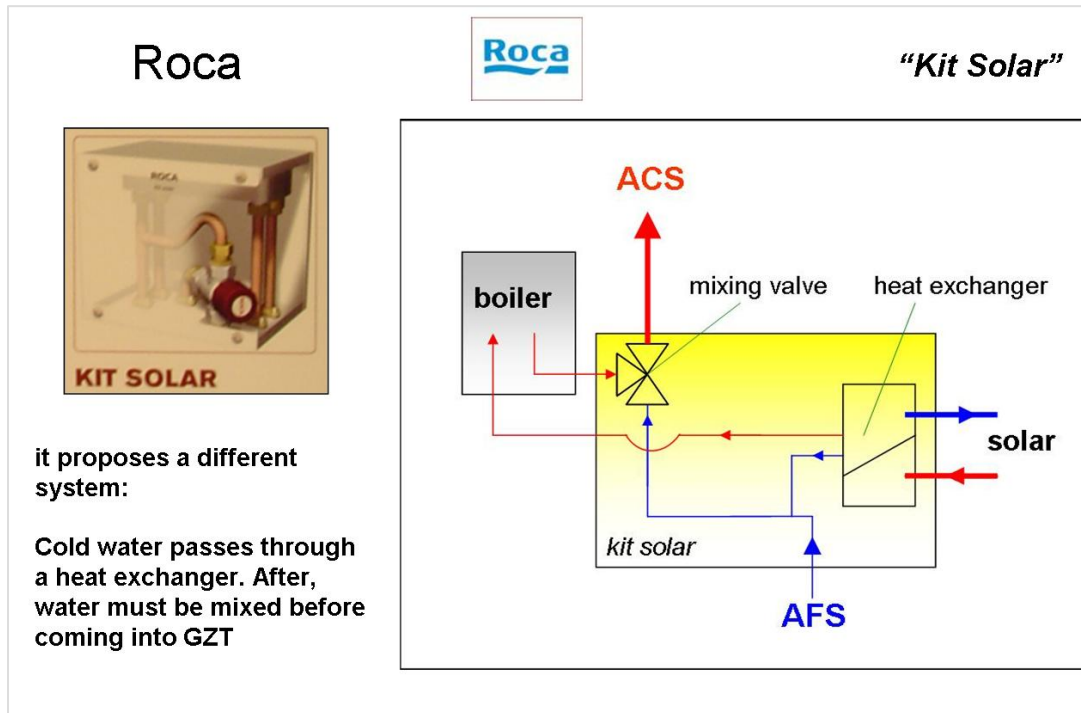
- Advantages:

- Cheap and pre-installed
- Image of high quality product: resist high temperatures (up to 75° C)

- Disadvantages:

- Consumption is always limited to heat water boiler flow.
- It's an external appliance, not included into the boiler.

- Roca

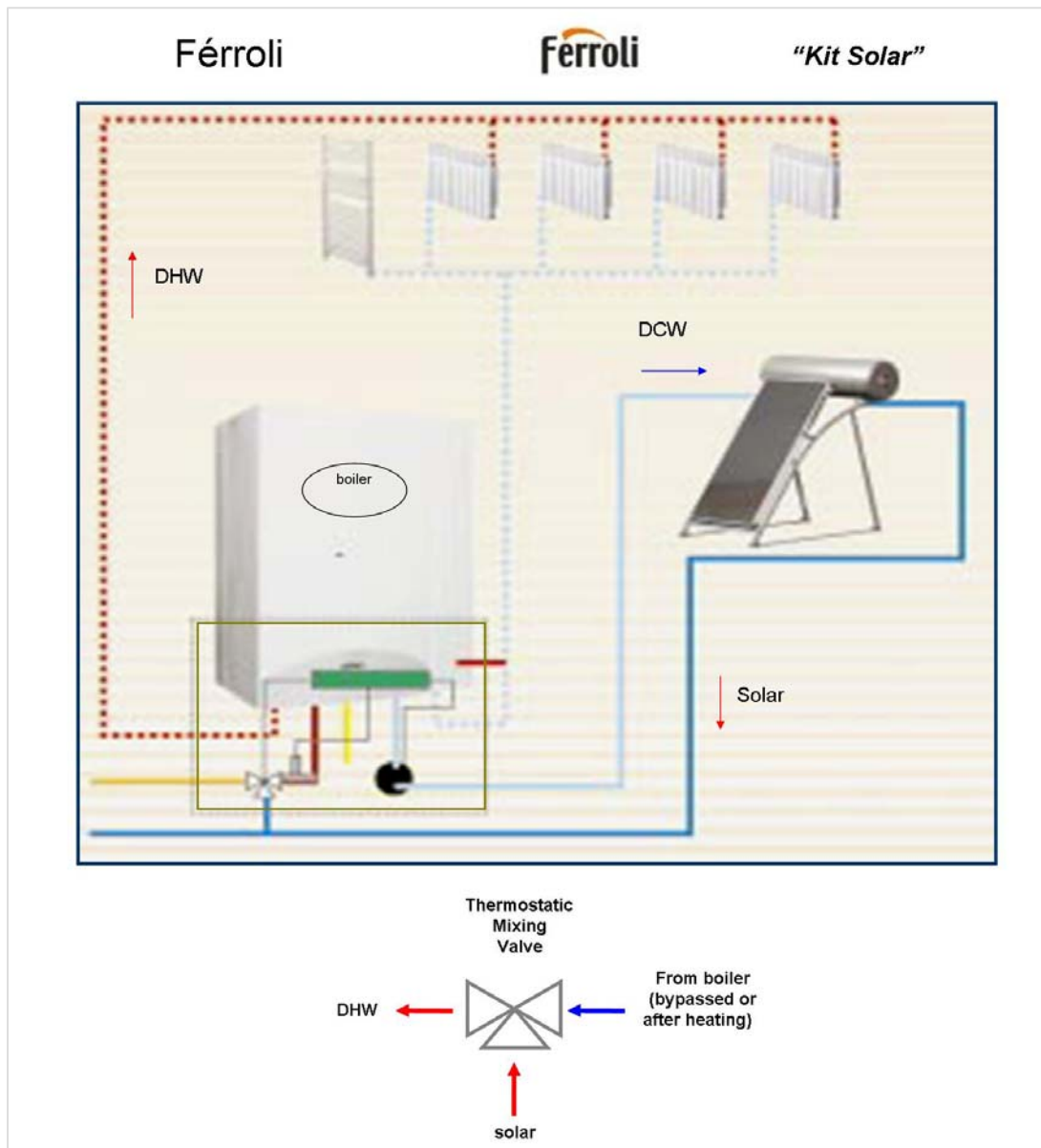


It proposes a different system from the rest of competitors: cold water passes through a heat exchanger, included into GZT (boiler). Afterwards, water must be mixed before coming into GZT.

- Advantages:
  - Cheap and pre-installed
  - Image of high quality product: resist high temperatures
- Disadvantages:
  - Efficiency of heat exchanger depends on cold water flow to get a high efficiency it is necessary a big heat exchanger.
  - It adds an additional heat exchanger installation efficiency is much lower.
  - It's an external appliance.
  - Consumption is always limited to heat water boiler flow.



- Férroli



*Férroli's solution for a solar kit*


Férroli proposes a solar kit located after boiler heating, just before consumption. They don't put limits to maximum temperature coming from solar collectors into the boiler, and only must mix hot water before delivery, to avoid risks. Solar kit also provides delays to connect and disconnect GZT when it receives when hot water is required. So, kit solar tries to avoid suddenly connections of the boiler, when hot water gets into the pipes between several consumptions.



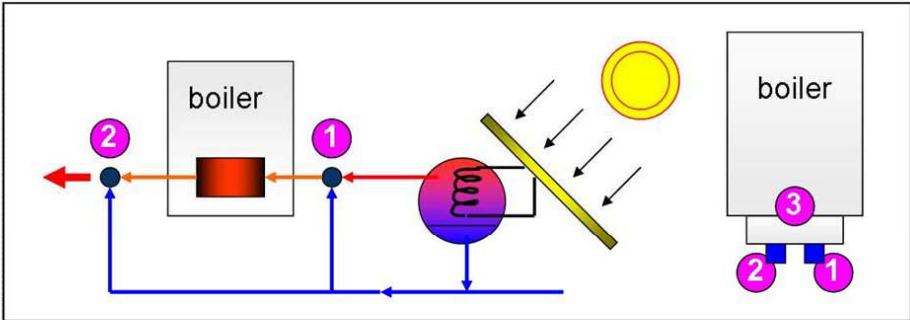

- Advantages:
  - Cheap and easy to install
  - Image of high quality product: resists high temperatures
  - Fine regulation of delays to connect and disconnect GZT when hot water is required
- Disadvantages:
  - Consumption is always limited to heat water boiler flow
  - It's an external appliance
- Manaut

## Manaut

HEIZUNGSSYSTEME





***“Kit Solar Minox”***

**Kit solar Minox**

- 1 - thermostatic valve
- 2 - mixing valve
- 3 - hydraulic connections

- includes cover, MAPL, thermostatic valve and mixing valve

*Manaut's solar kit “Minox”*

There is not much information about Manaut's solar kit, so it will be excluded from the following final comparison.

Here is a comparison table between all solutions:

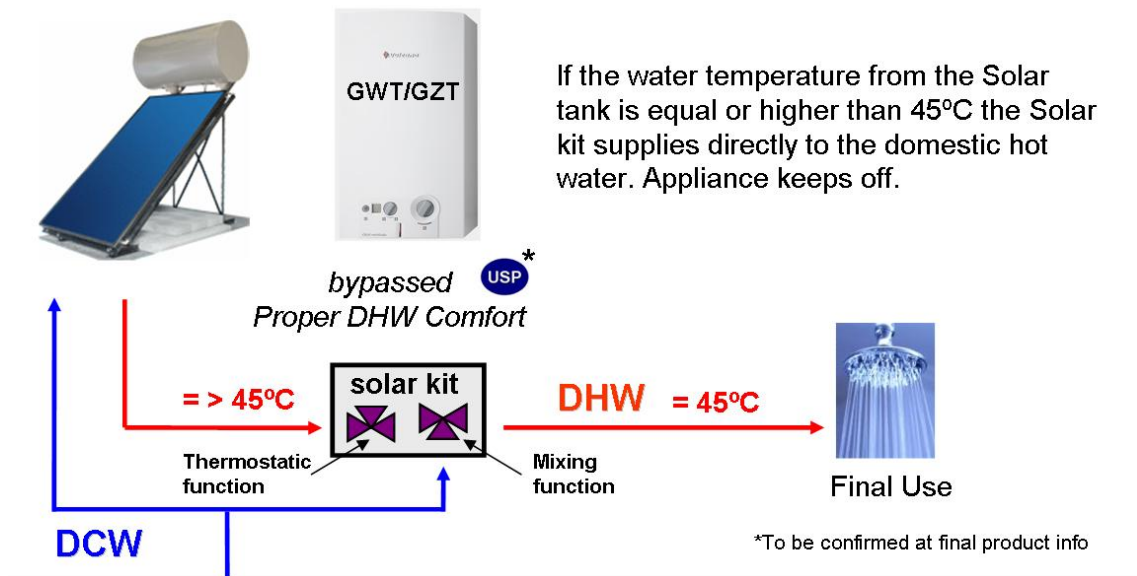
Brand	Technical Solution	Kit?	Advantages (+)	Disadvantages (-)
Saunier Duval	GWT: Thermostatic mixing valve before appliance. GZT: Solar Kit with an electronic mixing valve	No/Yes	<ul style="list-style-type: none"> <li>Cheap and high savings</li> <li>Usable for almost all SD appliances</li> </ul>	<ul style="list-style-type: none"> <li>Not complete solution</li> <li>Temperature Unstability</li> <li>No bypass</li> <li>Unesthetic</li> <li>Price</li> </ul>
Vaillant	GWT/GZT: Thermostatic mixing valve, joined to the appliance.	No	<ul style="list-style-type: none"> <li>Easy installation</li> <li>Cheap , very basic solution</li> </ul>	
Fagor	GWT: Thermostatic mixing valve, quite simple. For higher requirements, a solar GWT is available.	No	<ul style="list-style-type: none"> <li>Cheap , very basic solution</li> </ul>	<ul style="list-style-type: none"> <li>Not complete solution</li> <li>Temperature Unstability</li> <li>No bypass</li> <li>Unesthetic</li> </ul>
Roca	GZT: kit prepared connects to a GZT with external heat exchanger. It's possible to buy a kit included into the gas appliance.	Yes	<ul style="list-style-type: none"> <li>Possibility to get an integrated solution</li> </ul>	<ul style="list-style-type: none"> <li>Additional heat exchanger (lower installation efficiency)</li> </ul>
Férroli	For GZT, two parts: hydraulic & electronic. GZT delays ON/OFF as a function of the inlet water temperature.	Yes	<ul style="list-style-type: none"> <li>Cheap and easy to install</li> <li>Resists high temperatures</li> </ul>	

*Table of comparison between solar kit's competitor's*

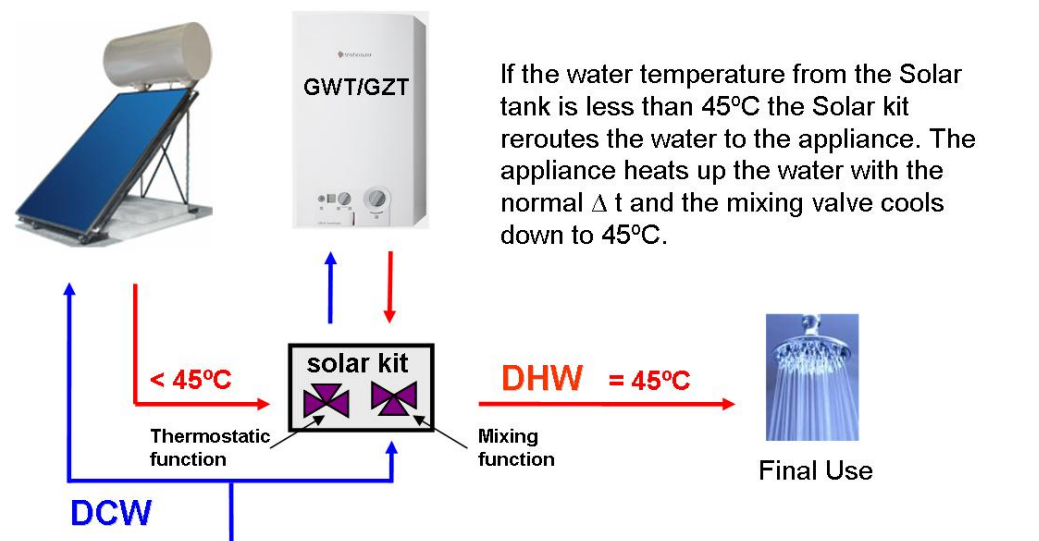
## BBT's solar kit product information

After all the required discussions and analysis, BBT is now introducing its new solar kit. Here is the final solution for the working principle, with the two scenarios:

### Scenario 1 – Temperature equal / **higher than presetting**



### Scenario 2 – Temperature below presetting



*Final working principle of the solar kit for both scenarios*

Here are the main benefits for customers and installers:

## Customer Benefits



- Prevents scalding by mixing the temperature down to 45°C
- Prevents damaging the appliance
- No need to buy a specific solar appliance
- Avoids peaks caused by ON/OFF cycles
- Appliance only works if temperature is below the setting
- When bypassing, water flow gets not lost by appliance deviation **USP** \*
- Proven solar compatibility with proper DHW comfort **USP** \*
- Savings costs
  - ➔ *less gas due to proper DHW comfort (appliances keeps off)*
  - ➔ *less maintenance due to less appliance working hours*



**End-User**

*Solar kit - Benefits for Customers*

## Installer Benefits



- Supporting new country legislation (ex: Spain)
- Can be used with all GWT and GZT kombi boilers
- Can be used with all Thermosyphon or Solar Storage Tanks
- Easy to install and maintain
  - ➔ Easy removable front cover with clip system
  - ➔ Easy access to the 3 way valves and construction
  - ➔ Using BBT standard connections

**Installer**



*Solar kit - Benefits for Installers*

## Two: Market and Product Range Analysis

There was the need to analyse whether it would be feasible to have a new GWT under the brand “Buderus” in Belgium, Hungary, Italy, Poland, Turkey and Austria. Buderus’ main products are boilers and central heating systems.

I was requested two things:

- analysing (through price mirrors<sup>2</sup> and other market information) competitor’s product ranges and price positioning, along with ours;
- while presenting to them the previous analysis, asking the potentially interested markets the following:
  - estimates on range, price and quantities for the new GWT,
  - market volume (by segment),
  - market share (by brand/group).

This would have to be done in a straight forward and user-friendly way so that we could get the answers as fast as possible.

The outcome was a powerpoint-based template in which the markets had to fill-in their respective feedback. After the filling-in, I organized the information in a final slide for each market as an overview.

For each market, there would have to be a decision about, first, whether it was worth to introduce a water heater under the Buderus brand, and if so, how to position it relatively to the competition. The conclusion at the end was that cannibalization<sup>3</sup> would occur in most cases, because in all these markets we have at least one brand present (in Italy we have 2 brands). Therefore, the decision was not to advance with this product for the time being. The following two slides are shown as an example of what I delivered.

---

<sup>2</sup> Price mirror: comparison between our prices and competitor’s prices in percentage (ours being the index)

<sup>3</sup> **Cannibalization:** in Marketing, cannibalization refers to a reduction in the sales volume, sales revenue, or market share of one product as a result of the introduction of a new product by the same producer.


**GWT BELGIUM**
**WR xx P**
[back to overview](#)

1 / 4

Brand / Model	Output (L / min)	Flue Type	Ignition Type	Price (€)
<b>JUNKERS</b> R 275 K/Plus	11	K	P	285
Vaillant atmoMAG 11 XZ	11	K	P	233
Bulex Opalia C 11	11	K	P	234
Chaffoteaux & Maury Senseo 10 CF	10	K	P	230
<b>JUNKERS</b> R 350 K/Plus	14	K	P	328
Vaillant atmoMAG 14 XZ	14	K	P	246
Bulex Opalia C 14	14	K	P	262
Chaffoteaux & Maury Senseo 13 CF	13	K	P	260
<b>JUNKERS</b> R 440 K/Plus	17	K	P	352

Belgium “WR xx P” appliances market overview, organized in a simpler way

**Overview**

**GWT HUNGARY**

P = piezo B = battery E = electric G = hydropower

[back to index](#)

SWH comments

Volume Share (%)	Product	JUNKERS	Vaillant	Beretta	FÊG	AEG	Saunier Duval	BUDERUS Output (L/min)	BUDERUS Price proposal (€)
Low Price 90 % (30 150)	<a href="#">W xx P</a>	11	11	11	13	11			
	<a href="#">WR xx P</a>		11, 14						
	<a href="#">WR xx AD P</a>	13			10				
Medium Price 8 % (2 680)	<a href="#">WR xx B</a>	11, 14	11, 14				11, 14	12, 16	+ 5% Junkers
	<a href="#">WRD xx B</a>								
High Price 2 % (670)	<a href="#">WR xx G</a>								
	<a href="#">WRD xx G</a>	14, 18							
	<a href="#">WT xx AME</a>	14, 17		13				15	+ 5% Junkers
	<a href="#">WTD xx AME</a>	14	14						
33.5 T	Market Share (%)	33	19	16	10	10	2	Quantities: 2006: 300 pcs / 2007: 600 pcs 2008: 800 pcs / 2009: 1000 pcs	

Template filled-in by Hungarian market responsible

### Three: Product Benchmarking

Benchmarking is the process of determining who is the very best, who sets the standard, and what that standard is. Product Benchmarking is commonly known as reverse engineering or competitive product analysis. It assesses competitor costs, product concepts, strengths and weaknesses of alternative designs and competitor design trade-offs. Next, I'll try to explain some ideas that I've learned while preparing benchmarking activities during my internship.

*Once we decide what to benchmark, and how to measure it, the object is to figure out how the winner got to be the best and determine what we have to do to get there. Benchmarking is usually part of a larger effort, usually a Process Re-engineering or Quality Improvement initiative.*

#### Reasons for Benchmarking

If you don't know what the standard is you cannot compare yourself against it, and you also have to know where the competitors stand. But benchmarking goes beyond comparisons with competitors to understanding the practices that lie behind the performance gaps. It is not a method for 'copying' the practices of competitors, but a way of seeking superior process performance by looking outside the industry. Benchmarking makes it possible to gain competitive superiority rather than competitive parity. The term "benchmark" refers to the reference point by which performance is measured against. It is the indicator of what can and is being achieved, and the term "benchmarking" refers to the actual activity of establishing benchmarks and best practises.

#### Benchmarking Benefits

There are many benefits related to the benchmarking activity. The following list summarises the main ones:

- provides realistic and achievable targets
- prevents companies from being industry led
- challenges operational complacency
- creates an atmosphere conducive to continuous improvement
- allows employees to visualise the improvement which can be a strong motivator for change



- confirms the belief that there is a need for change
- helps to identify weak areas and indicates what needs to be done to improve.

### Benchmarking Common Mistakes

Of course that there are common mistakes related to benchmarking, that need to be avoided. Some of the most interesting ones are, for example:

- Confusing Benchmarking with Research:

Benchmarking presupposes that we are working on an existing process that has been in operation long enough to have some data about its effectiveness and its resource costs. Starting a new process such as writing a new handbook about a topic or task based on existing material is research, not benchmarking.

- The process being too large and complex to manageable:

A process is a group of tasks. A system is a group of processes. Avoid trying to benchmark a total system - it will be extremely costly, take ages, and be difficult to remain focused. It's better to select one or several processes that form a part of the total system, work with it initially and then move on to the next part of the system.

- Misalignment:

Choosing a benchmarking topic that is not aligned with the overall strategy and goals of the business; or worse, cuts across some other initiative the organisation is already taking. A Lead Team at the strategic level needs to oversee the benchmarking project and make sure that it is in line with what is happening in the business as a whole.

- Picking a topic that is too intangible and difficult to measure:

"Employee communication", for example, is probably the most slippery concept that exists in an organisation, but it is often cited as one of the worst problems, so many organisations try to benchmark it. Encourage your benchmarking team to select instead a part of the topic that can be observed and measured; for instance, the process of distributing memos around the organisation.



## Benchmarking RSF Appliances

I was involved in such an activity in November 2005 for RSF (Room Sealed Fan Assisted) appliances. The benchmarking included analysing and comparing 3 appliances of the room-sealed fan assisted segment (one from Aveiro plant and two from the competition). Namely:

- *BBT Celsius 11 L*
- *Vaillant turbo MAG 11*
- *Demrad C 275 F*

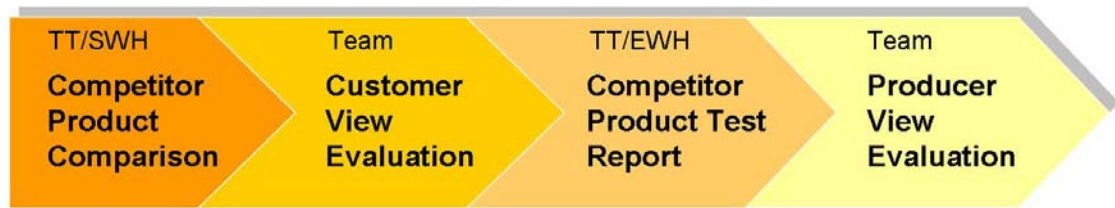
The objective of this benchmarking is to find valuable sales arguments in our product to report to our clients. *Demrad* and *Vaillant* were aggressively entering the water heater market in Hungary at the time with both basic and premium water heaters. One of our Sales employee was able to purchase a Demrad equivalent of Junkers Celsius (our room-sealed fan assisted appliance) at a retailer price of 202 €, without VAT. This price is 60% less than ours. It was then necessary to explain the price difference to our customers, hence the need for a Product Benchmarking to support the arguments. In addition, it would be useful to learn from their construction and apparent cost-effectiveness.

My task was to gather all the elements discussed and write a final report to be then presented to the customers, explaining this price difference.

As far as GWTs are concerned, the benchmarking objectives in TTPO are very specific, and are mainly:

- systematic evaluation of products
- comparison of own products and concepts against competition
- bulding up knowledge database to define competitive advantages and USP's (Unique Selling Points)

A team which is formed for a benchmarking activity in TTPO for GWT usually involves members of Product Management (TT/SWH), Development (TT/EWH), Quality Management (TTPO/QMM) and Technical Assistance (TTPO/SPT3) and is composed of 4 modules, presented as following:



*the 4 modules in TTPO GWT Benchmarking*

### 1 - Competitor Product Comparison (TT/SWH)

Source: Internet, Catalogues, Leaflets, Manuals (user, installer)

Content: Collection of data (size, power, main features, price...)

Outcome: Database

### 2 - Customer View Evaluation (Team)

Customers: End-user, installer, market organization

Source: Product evaluation; group discussion

Content: Rating of products according criteria list

Outcome: Ranking of products / "Product Value"

### 3 - Competitor product test report (TT/EWH)

Source: Laboratory test (internal or external)

Content: Detailed data (real performance)

Outcome: Engineering test report

### 4 - "Producer view" evaluation (Team)

Source: Product evaluation; group discussion

Content: Rating of products (technical concept, lifetime, cost, ..)

Outcome: Ranking of products / "Product Value" / Database for specification

After having the appliances available, the team had its 1<sup>st</sup> Team meeting, where they would be "opened-up" on a table and checked in detail. These were the main points analysed, with an example of gathered data:

Then, the Development Department (TT/EWH), who was responsible for testing the appliances and evaluating the technical aspects, would provide us with performance indicators and respective values that would be filtered and included in the final report.

**Packaging**

Robustness

Opening

Design

Handling

**Manuals and labeling**

Manual

Labels (placement and reading)

Finishing \ defects

**Handling \ Ergonomics**

Touch of knobs \ grip comfort

Handling of knobs

Serigraphy (user friendliness)

Overall look

On\Off awareness

Visible Quality of materials

Display

Quality perception

**Serviceability**

Easy to open (Y/N)

Accessibility of components

Number of parts

Easiness of reaching parts

Easiness of changing parts

Mounting

**Connections**

Cold Water

Hot Water

Gas

**Components**

Safety devices

Chimney

Burner

Heat exchanger

#### Power & Gas

max. Rated output (kW)

min. Rated output (kW)

Ignition type

Gas valve material

min. pressure start up (bar)

min. pressure shut off (bar)

#### Water

water flow Output (l/min)

water valve material

flow regulation

min. pressure start up (bar)

min. pressure shut off (bar)

#### General

Dimensions

Weight

Comments

As an example: at a first glance, we noticed that our appliance could not be stored horizontally, unlike the competitor's. Also, the manuals and printed information were different from each other in size and content.

These first impressions are very important and form a good starting point of discussion, because everyone else will probably feel the same about the product at a first sight.






After this analysis, the engineering elaborates the testing report, which is very technical, and the final report is then finished and treat with "reader-friendly" language in order to send to the customer.

The conclusion shows that there is a clear advantage of our *Celsius* against the other benchmarked competitors in terms of technical performance, namely:

- Highest stability of water temperature and fastest response time for best in class comfort and less gas and water consumption,
- Reset button for quick re-start of the appliance after failure/error appearance,
- Last but not least, Celsius is the smallest RSF appliance of the benchmarked products,
- Demrad is showing strong weaknesses against Celsius and Vaillant concerning stability inside of the appliance (instable construction),
- Advantages for the competitors are basically the digital display with temperature, the failure code indication (only available for Celsius Plus) and a modern design,

Both Demrad and Vaillant appliances can be stored horizontally but Vaillant showed weaknesses in the packaging. The Demrad packing is the most attractive but shows flaccidities inside the packing (broken foam).

Here are some excerpts of the final report, which was sent to customers:

Benchmarking RSF		BBT THERMOTECNIK GMBH A Bosch Group Company	
General Comparison			
	  <b>BOSCH</b>		
	WT 11	Vaillant turboMAG 11	Demrad C 275 F
Output (L / min)	11	11	11
Net Weight (kg)	21	21.4	18.8
Gross Weight (kg)	23.5	24	20.4
Dimensions (mm)	670 x 340 x 220 (50L)	682 x 352 x 266 (63 L)	628 x 348 x 238 (52 L)
Dimensions Box	800 x 415 x 290 (96L)	750 x 435 x 340 (110L)	700 x 395 x 290 (80L)
Nominal Output (kW)	19.3 (approved by tests)	19.5 (approved by tests)	19.2 (approved by tests)
Water Pressure (bar)	0.3 – 12	0.2 – 13	0.1 - 10
Min Water flow	3.2 l/min	3.2 l/min	3.1 l/min
Minimum power	7.0 kW (tested)	9.9 kW (tested)	7.2 kW (tested)
Efficiency (%)	89	87	86
Safety	Flame failure device Temperature limiter Pressostat	Flame failure device Temperature limiter Pressostat	Flame failure device Temperature limiter Pressostat
End-user price (€)	Portugal: 446 + VAT (no exhaust accessories)	Portugal: 389 + VAT	Hungary: 202 + VAT

## Benchmarking RSF

**BBT THERMOTECHNIK GMBH**  
 A Bosch Group Company

### Celsius WT 11

#### ➡ Commercial arguments

- **Easy installation** through concentric flue duct
- **Stable warm water temperatures** through electronically modulated gas valve
- **Highest warm water comfort** through electronic temperature regulation
- **Fast response** on start up and during operation
- **Easy temperature programming** through turning knob
- Reset & "Technical trouble" indicator
- "Burner on" indicator
- On / off switch
- Safety: Flame failure device, Temperature limiter, Pressostat

- *Celsius Plus includes: Remote Control*
  - + Digital Display
  - + Automatic Water Flow Regulation



Work scope all rights of disposal such as copying and passing on to third parties

TT / SWH

## Benchmarking RSF

**BBT THERMOTECHNIK GMBH**  
 A Bosch Group Company

### Vaillant turboMAG 11 L

#### ↑ strengths

- Very solid construction – similar to a boiler
- Temperature Stability:  $\pm 1^\circ \text{C}$
- Digital display with error codes
- Horizontal warehousing possibility

#### ↓ weaknesses

- Tooling: 3 different screw drivers are needed for the appliance to be installed / tested
- The appliance doesn't allow sudden temperature changes (from max to min) - tested
- No reset button in the electronics (reset by water)
- Mechanical problems (instability of ON/OFF knob during testing)
- Small display
- Response time: approx. 30s
- Heat exchanger is of Tinned Copper – bad for environment
- Bad packaging behaviour – handles brake when lifting



Benchmarking RSF

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 Work scope all rights of disposal such as copying and passing on to third parties

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TT / SWH

## Benchmarking RSF

**BBT THERMOTECHNIK GMBH**  
A Bosch Group Company

### Demrad C 275 F

#### ↑ strengths

- Compact design
- Horizontal warehousing possibility

#### ↓ weaknesses

- Bad packaging behaviour
- Response Time: aprox. 30 s
- Very instable burner
- No reset button in the electronics.
- No plug: only the wire to install the appliance (directly to the wall or using a plug) – see photo below
- Heat exchanger is of Tinned Copper – bad for environment

**DEM RAD**



Photo  
(no plug)

Benchmarking RSF

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## Benchmarking RSF

**BBT THERMOTECHNIK GMBH**  
A Bosch Group Company

### Handling, Ergonomics & Serviceability 2 / 2



		Celsius WT 11	Vaillant turboMAG 11	Demrad C 275 F
Control box	ON / OFF knob	- with resistance - mounted	- without resistance - mounted	- without resistance - not mounted
	Temperature Selection knob	- without resistance (270°) - mounted - from 35 to 60°C	- with resistance (26 positions, 270°) - mounted - from 38 to 63°C	- without resistance - not mounted - from 35 to 60°C
	Reset Button	Yes	No	No
	Function Indication	- Function / Error button	- Display: Selected temperature and Error Codes	- Display: Selected temperature and Error Codes
Front Panel				

Benchmarking RSF

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*Extracts from the Benchmarking RSF report.*



## Four: Competitor Product Range Analysis

### 1: Rinnai UK

Rinnai <sup>4</sup> is the only producer that sells high output water heaters in Europe. This task consisted on getting information about one of our main competitors in the UK (*Rinnai UK*). My delivery was its corporate profile, product range analysis and research of several case studies in which Rinnai UK was involved.

Rinnai UK was established in 2003 to supply the UK market with Rinnai products directly, instead of through distributors (as the last 25 years). It offers customer service and sales support to many hundreds of customers. Its main goals are expand marketing of existing product ranges, offer better levels of technical advice and spares support and ensure price stability through a direct line to the factory. In their first year, they had the objective of consolidating and building of own customer support network (transferring trade by former distributor Drugasar, Ltd.)

The product range analysis was mainly directed to the new *Infinity Series*. This new range of products from Rinnai differs a lot from the old models, mainly in the following aspects:

Old models	<i>Infinity</i> models
Can run out of water	Does not run out of hot water
Bulky, heavy and take up lots of floor space	Space saving, compact design
No thermostatic valves, scalding might occur	Control water temperature is possible
Waste energy and money	Endless hot water delivered more efficiently and with greater control.

*Comparison between old models and infinity models (Rinnai UK)*

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<sup>4</sup> *Rinnai* is a Japanese company that is currently one of the main water heater producers world-wide.

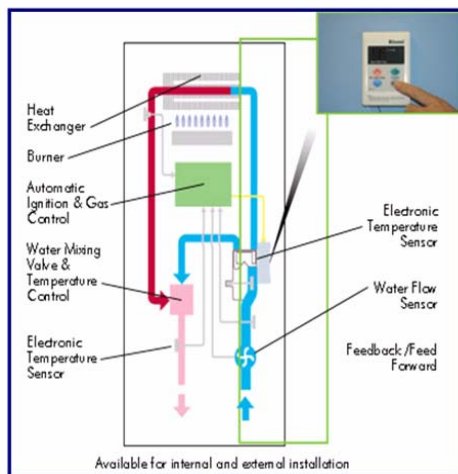


Also, some of the new features are: hot water provision at a predetermined temperature, digitally controlled, often eliminates the need for shower mixers and thermostatic devices, multiple units can be linked via a *manifold*<sup>5</sup> arrangement. The following images show excerpts from the presentation I prepared about new features and possible manifold configuration of this Rinnai *Infinity* Series:

**Rinnai UK presentation** **BBT THERMOTECHNIK GMBH**  
A Bosch Group Company



## Products Overview – *Infinity* series



- The **heat exchanger** design allows to provide the **largest capacity flow rates**, whilst ensuring **near mains pressure**
- The new **reduced NOx burner technology** leads to lower greenhouse emissions.
- Capable of having **4 controllers**
- **CE** and **WRAC** approved
- **Frost protection** on all units

Every model was analysed in detail and for each one I prepared one slide presentation with every relevant information condensed (as in the following image).

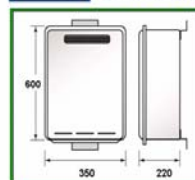
**Rinnai UK presentation** **BBT THERMOTECHNIK GMBH**  
A Bosch Group Company



## Products Overview - GWT – *Infinity 32e*



**external**  
Maximum  
flow rate at  
25 °C rise:  
**32 L/min**  
**€ 1198 rsp**



Installation	External wall mounted
Weight	29 kg
Exhaust system	Forced Exhaust
Temperature range	37 °C - 75 °C
Ignition method	Direct electronic ignition
Gas consumption - Natural gas	5.5 kWh low – 69.0 kWh max
Gas consumption - Propane	5.5 kWh low – 69.0 kWh max
Hot water delivery capacity	24 L/min raised 33 °C
Min operating capacity	2.7 L/min
Nominal operating pressure	1.4 - 8.3 bar
Power supply	AC 230 V (50 Hz)
Electrical consumption	83 W

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11/000000

<sup>5</sup> manifold (or cascading): connection of several appliances together in order to provide higher flow of hot water

In the end a summary slide with the general overview is presented as following:

Rinnai UK presentation

**BBT THERMOTECHNIK GMBH**  
 A Bosch Group Company

Rinnai

## Products Overview – Table of Comparison

MODEL	VOLUME (L)	WEIGHT (kg)	OUTPUT (L/min)	EXHAUST TYPE	IGNITION TYPE	PRICE rsp (€)
16 e	31.5	15	16	Forced Exhaust	Direct electronic	514
20 e	31.5	16	20	Forced Exhaust	Direct electronic	618
24 e	35.7	18	24	Forced Exhaust	Direct electronic	1048
26 i	47.0	22	26	Direct Vent Forced Flue	Direct electronic	1062
32 e	46.2	29	32	Forced Exhaust	Direct electronic	1198
50 i	47.0	22	26	Direct Vent Forced Flue	Direct electronic	1212
70 e	62.0	29	32	Forced Exhaust	Direct electronic	1348

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*General product range overview (Rinnai Infinity series)*

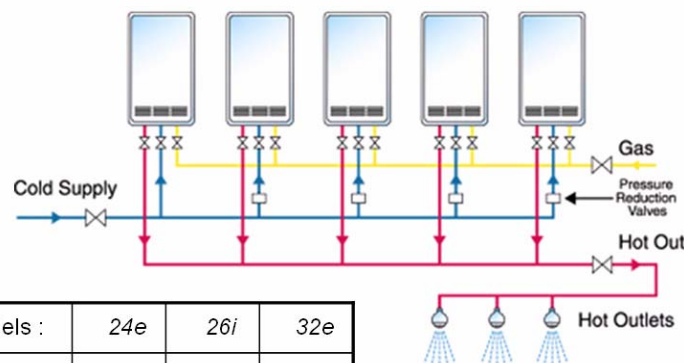
Rinnai UK presentation

**BBT THERMOTECHNIK GMBH**  
 A Bosch Group Company

Rinnai

## Manifold configuration - 24e 26i 32e

Up to 5  
heaters can  
be manifolded  
together



With 5 models :	24e	26i	32e
Flow Rate (L/min) with 25° C rise	121	126	157

*Manifold configuration with 5 models of 24, 26 and 32 L/min and total flow rate at  $\Delta 25^{\circ}\text{C}$ .*

Also, some of the situations where Rinnai is using its products have developed into specific case studies. I gathered and presented many of them as simply as possible to explain in practical terms the potential of this competitor. Here are two examples with short descriptions.

- In certain “Holiday Parks”, the problem was that keeping high amounts of water heated at 60 °C to combat Legionella during considerable periods of time is expensive, and it is also needed to blend it with cold so that there is a safe operating temperature, which involves using thermostatic or mixing valves. The solution Rinnai offered was basically to join *Infinity* heaters can be joined together to ensure an infinite number of shower heads can be safely supplied with water at peak demand at a set temperature that will not fluctuate even if other outlets are used.

- The Shieldhill Hotel Scotland is a popular venue for weddings and other large social events. It has 16 bedrooms. All of them have en-suite bathrooms, with 7 of them featuring a jacuzzi. These facilities, combined with the 400-seat restaurant, created a heavy and expensive demand on the hotel’s hot water supply. The solution they found was a water system that was custom-designed with 3 *Infinity* units manifolded together and linked to a 500 litre buffer vessel. This provides enough hot water to supply all of the hotel’s needs.

All case studies were presented in the following format:

Rinnai UK presentation	<b>BBT THERMOTECHNIK GMBH</b> A Bosch Group Company
 <b>Case Studies – Sydney Cricket Ground (Bradman stadium)</b>	



**Problem:** On completion of the new changing rooms is what of outmost importance to have a continuous, controllable availability of cost effective water. The problem was deliberated over with several alternatives.

**Solution:** After taking into consideration of the initial outlay, installation costs, usage and maintenance costs, Rinnai stood out to be the only option amongs competitors. An Infinity 24 Plus Internal was also used in the on site new restaurant, this unit was vertically flued through the roof with access via a door in the corridor.

*Excerpt from Rinnai Case Studies*

## 2: China Vanward

Vanward, established in 1993, is one of the leading manufacturers and exporters of gas and electric appliances in Asia, covering an area of 300,000 sq. meters. It mainly manufactures and sells gas water heaters, storage electrical water heaters, gas stoves, sterilizing cupboards as well as other electrical appliances. Vanward is a founder and shareholder of China Minsheng Bank. It gained ISO 9001 certification in 1996. Most of the products have acquired international safety certifications such as CCC, CE and UL, and enjoyed good reputation in the world. Moreover, the company has many excellent and well-experienced R&D engineers and they have been continuously creating new products. The yearly output of each type is up to 1,000,000 units meeting great demands from the world market. They were becoming a strong competitor on some of our markets, using low price as a key factor.

My goal was to analyse their entire water heater product range, find similar BBT's appliances and make a comparison. They have three lines of product (JSD, JSG, JSQ). First, I took the complete line, afterwards an individual analysis of the appliances, and concluding, the comparison with our products. The following images show, in summary, how it was presented.

China Vanward vs BBT						BBT THERMOTECHNIK GMBH		
<b>JSD segment</b> ignition: <b>Battery</b> flue type: <b>K</b>								
						segment   kW   L / min ↓   ↓   ↓ <b>JSD 10 – 5 A</b>		
JSD Model								
Output	6 kW 3 L/min	10 kW 5 L/min	11 kW 5.5 L/min	12 kW 6 L/min	16 kW 8 L/min	16 kW 8 L/min	24 kW 12 L/min	24 kW 12 L/min
Display	No	No	No	Yes	No	Yes	Yes	Yes
Safety	- 20 m timer - IC-ion flame sensor - No water burning protection	- 20 m timer - IC-ion flame sensor - No water burning protection	- 20 m timer - IC-ion flame sensor - No water burning protection	- 20 m timer - IC-ion flame sensor - No water burning protection	- 20 m timer - multiple... - No water burning protection	- 20 m timer - IC-ion flame sensor - No water burning protection	- 20 m timer - IC-ion flame sensor - No water burning protection	- 20 m timer - IC-ion flame sensor - No water burning protection
H	346	478	478	478	498	590	630	630
W	228	310	310	312	332	327	360	360
D	118	110	110	119	159	180	145	145
Volume (L)	9	16	16	18	26	35	33	33

(click appliance for details)

[back to index](#)

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## China Vanward vs BBT

**BBT THERMOTECHNIK GMBH**

### JSD12-6CL All-weather Water Heater with Highly Sensitive IC-ion Flame Sensor

#### Features:

- With fashionable red digital water temperature indicator in black glass band
- Automatic ignition at low water pressure 0.02-1.0MPa
- Innovative burner part and heat exchanger in the latest design, high efficiency and energy-saving, safe and gas-saving
- Adopting direct ignition on main burner part
- Highly sensitive IC-ion flame sensor works at unexpected flameout situation to avoid gas leakage accidents, with overheat protection,
- no-water burning protection, prevents freezing and auto flameout device, safe and high quality
- With 20-minute timer
- Suitable for four-season use. Its sub-section flame adjustment function results in a large range of water temperature for selection
- Minimum order quantity: 611pcs/20' container



#### Main Export Markets:

North America  
 Mid East/Africa  
 Central/South America  
 Australasia  
 Southeast Asia  
 Mediterranean

#### Primary Competitive Advantages:

- Experienced Technical Staff
- Price
- Product Performance
- Prompt Delivery

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Department

## China Vanward vs BBT

**BBT THERMOTECHNIK GMBH**

### JSQ 12 / JSQ 16 vs Compact 2 KME



vs

**BBT THERMOTECHNIK GMBH**  
 A Bosch Group Company

	JSQ25-12A	JSQ25-12BL	JSQ25-12BU	C2 KME 11	JSQ32-18K	C2 KME 17
ignition: <u>Battery</u> flue type: <u>KME</u>						
Output	25 kW 12 L/min	25 kW 12 L/min	25 kW 12 L/min	18.7 kW 11 L/min	32 kW 18 L/min	30 kW 17 L/min
Display	No	Yes	Yes	Yes	No	Yes
Safety	- 20 m timer - IC-ion flame sensor - No water burning protection - Multiple safety..	- 20 m timer - Multiple safety..	- 20 m timer - Multiple safety..	- Flame failure device - Temperature limiter - Pressostat	- 20 m timer - Multiple safety..	- Flame failure device - Temperature limiter - Pressostat
H W D	528 328 100	528 328 100	N/A	580 310 220	565 370 128	655 425 220
Volume (L)	17 (43% smaller)	17 (43% smaller)	N/A	40	27 (44% smaller)	61

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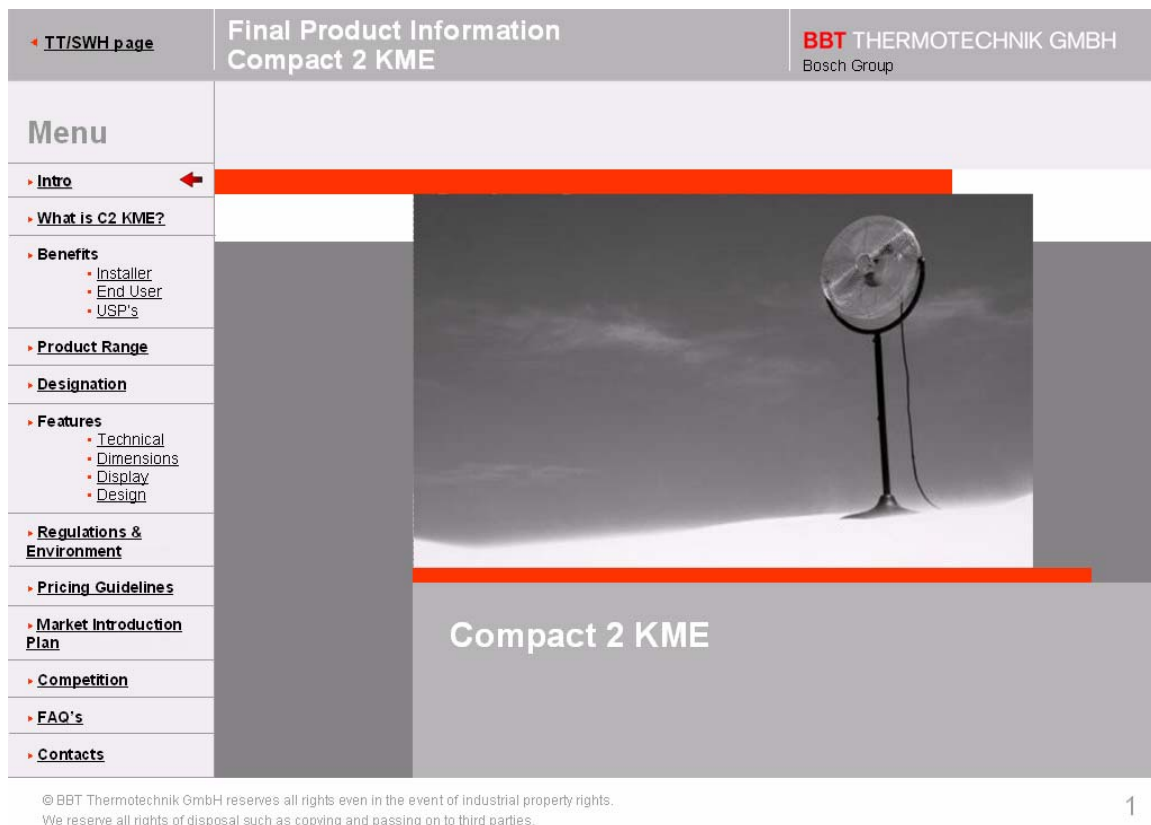
Department

*Excerpt from China Vanward Product Range Analysis*

## Five: Product Information

During my internship I worked on several Final Product Information documents. They are essential for internal communication within BBT, so that there is a general overview of new products and evaluate the interest of some markets in acquiring them.

It's based on a powerpoint platform and it is supposed to be simple, short (no more than 40 slides, depending on the complexity of the product), self-explanatory and visually attractive. It can also be used as a source of information for future needs. Frequently it is necessary to present a certain product (fairs, market visits, customers visit to TTPO, workshops, etc) and all supporting presentations can be based on this file. Below you can see how a Final Product Information is presented (index slide).



*Final Product Information cover - Compact 2 KME*

After it's ready, the Product Information is first sent to the Project Leader and remaining team for feedback and then sent to market responsables and other product managers, to serve its purpose.

The structure of a Product Information should include the following points:


- “What is...?” - a general description about the product / comparison with old models (if applicable);
- Benefits for the installers, end-users, and list of USP’s (Unique Selling Points);
- The description of product range, which helps understanding the differentiation and positioning of all the product types;
- The designation of the products (used for internal processes) and also commercial use;
- The features in detail (technical specification, product features);
- The highlighting of the product design, specially when it’s new and needs to be explained in detail;
- Regulations and environmental concerns that are related to the product;
- The pricing guidelines and recommendations;
- The market introduction plan (includes brands, dates and markets);
- Short (up to 3 slides) competition information (which products will strongly compete with our product, referring only to the main players)
- FAQ’s (Frequently Asked Questions) about the new product;
- Contact information for further questions (usually the Product Manager or Project Leader).

As an example, I will use the Final Product Information of the new product Compact 2 KME.

Compact 2 KME was introduced in the first markets during March 2006. This is a sort of appliance that is recommended for installations with flue exhaustion problems. It has a simple installation and improved serviceability through reduced dimensions (up to -27%\*) and weight (up to -20%\*), with increased safety in the exhaustion of combustion gases.

This was the first Product Information released with the new layout, which includes an index always present at the left margin, working with hyperlinks as well as coherent design and structure.

The following slide, for example, highlights these safety features:

<a href="#">TT/SWH page</a>	<b>Final Product Information</b> <b>Compact 2 KME</b>		<b>BBT THERMOTECHNIK GMBH</b> Bosch Group
<b>Menu</b>	<b>USP's - Safety</b>		
<ul style="list-style-type: none"> <li>Intro</li> <li>What is C2 KME?</li> <li>Benefits           <ul style="list-style-type: none"> <li>Installer</li> <li>End User</li> <li>USP's ←</li> </ul> </li> <li>Product Range</li> <li>Designation</li> <li>Features           <ul style="list-style-type: none"> <li>Technical</li> <li>Dimensions</li> <li>Display</li> <li>Design</li> </ul> </li> <li>Regulations &amp; Environment</li> <li>Pricing Guidelines</li> <li>Market Introduction Plan</li> <li>Competition</li> <li>FAQ's</li> <li>Contacts</li> </ul>	<ul style="list-style-type: none"> <li>→ <b>Safety system against default use</b> <b>USP</b> <ul style="list-style-type: none"> <li>- controller blocks appliance in case of ignition attempts under unsafe conditions</li> </ul> </li> <li>→ <b>In case of insufficient exhaustion</b> <ul style="list-style-type: none"> <li>- the pressure switch acts and blocks the appliance</li> <li>- limits emission level</li> </ul> </li> <li>→ Most suitable for long horizontal chimney pipes</li> <li>→ <b>Anti overflow system</b> <ul style="list-style-type: none"> <li>- the appliance ensures you don't have accumulation of harmful gases on the surrounding environment (rooms, flats, house), even under deficient exhaustion conditions (lack of draught)</li> </ul> </li> <li>→ <b>Better ignition</b> <ul style="list-style-type: none"> <li>- reduced ignition time and failures</li> </ul> </li> </ul>		
		<b>USP</b> first & only appliance in the market to offer this feature.	

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*Safety features of the Compact 2 KME*

The next slides show the Benefits for the End-User, Designation, Technical Features, Design and Competition, just to provide some examples of the content of a Product Information.



<a href="#">TT/SWH page</a>	<b>Final Product Information</b> <b>Compact 2 KME</b>		<b>BBT THERMOTECHNIK GMBH</b> Bosch Group
<b>Menu</b>	<b>Benefit for end user</b> <span style="float: right;">1/2 </span>		
<a href="#">Intro</a>	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div> <p><b>„Small size, High safety“</b></p> </div> <div> <ul style="list-style-type: none"> <li>→ The right appliance for areas with bad exhaustion conditions</li> <li>→ Increased safety in the exhaustion of combustion gases</li> <li>→ Compact size</li> <li>→ Fulfils all requirements regarding hot water and appliance dimensions</li> </ul> </div> </div>		
<a href="#">What is C2 KME?</a>			
<a href="#">Benefits</a> <ul style="list-style-type: none"> <li>• <a href="#">Installer</a></li> <li>• <a href="#">End User</a> ←</li> <li>• <a href="#">USP's</a></li> </ul>			
<a href="#">Product Range</a>			
<a href="#">Designation</a>			
<a href="#">Features</a> <ul style="list-style-type: none"> <li>• <a href="#">Technical</a></li> <li>• <a href="#">Dimensions</a></li> <li>• <a href="#">Display</a></li> <li>• <a href="#">Design</a></li> </ul>			
<a href="#">Regulations &amp; Environment</a>			
<a href="#">Pricing Guidelines</a>			
<a href="#">Market Introduction Plan</a>			
<a href="#">Competition</a>			
<a href="#">FAQ's</a>			
<a href="#">Contacts</a>			

*Benefits for End-User (Compact 2 KME)*

There are several ways to highlight and explain Product Benefits. In SWH, we use the following approach: Customer Insight - Benefits - Reason Why.

Here is an example used for an Electric Storage Tank, from the End Consumer perspective, which is very self-explanatory:

END CONSUMER		
Customer Insight:	Benefit:	Reason why:
<ul style="list-style-type: none"> <li>Free maintenance and long lasting appliance</li> </ul>	<ul style="list-style-type: none"> <li>Reliable</li> </ul>	<ul style="list-style-type: none"> <li>Steel enameled internal tanks. Magnesium anode.</li> </ul>
<ul style="list-style-type: none"> <li>Customer wants to install in different places</li> </ul>	<ul style="list-style-type: none"> <li>Easy installation</li> </ul>	<ul style="list-style-type: none"> <li>Reversible tanks: allows installation in horizontal and vertical position.</li> </ul>
<ul style="list-style-type: none"> <li>Customer wants to save energy</li> </ul>	<ul style="list-style-type: none"> <li>Energy saving</li> </ul>	<ul style="list-style-type: none"> <li>Night tariff feature (thermostat programming). Thicker polyurethane layer for tank isolation.</li> </ul>
<ul style="list-style-type: none"> <li>Several options suitable for different needs</li> </ul>	<ul style="list-style-type: none"> <li>Wide range in terms of capacity, features and installation</li> </ul>	<ul style="list-style-type: none"> <li>Basic, comfort and top ranges. Capacities (liters) with the highest demand are always available in each segment. Vertical and horizontal installation.</li> </ul>

*Customer Insight - Benefit - Reason Why" approach*

Every appliance has its own TTNr (TT number) and respective internal designation. This enables a fast identification and adds organizational value. The designation format for water heater in BBT is composed of the following:

**MODULATION TYPE**

- W** Instantaneous gas water heater with manual output control
- WR** Instantaneous gas water heater with automatic output control
- WT** Instantaneous gas water heater with thermostatic temperature control

**DISPLAY**

- D** appliance with display

**OUTPUT (L/min)**

- 11**
- 14**
- 18**
- ...

**FLUE TYPE**

- open flue with gas deflector, without chimney connection
- K** open flue with draught diverter
- KM** open flue appliance with fan
- A** Balanced flue appliance with wall duct, room sealed
- AM** Fan assisted appliance, room sealed operation

**IGNITION TYPE**

- P** Piezo ignition
- E** Single hand ignition
- B** Battery ignition
- E** Electronic ignition
- G** Hydropower ignition

**GAS TYPE**

- 13** Butane / air mixture
- 21** Natural Gas L
- 23** Natural Gas H
- 31** Butane / Propane

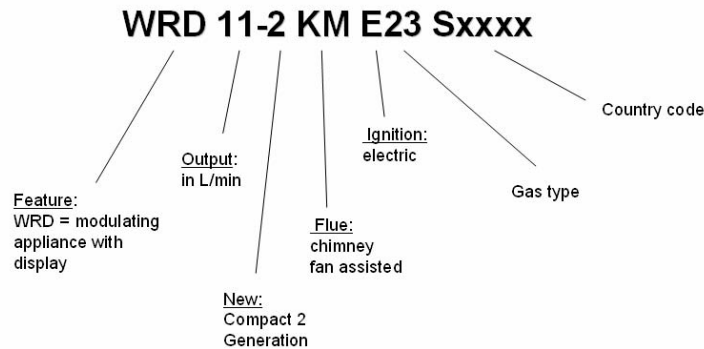
**COUNTRY CODE**

- S - - - -** Four digit numbers

The following slide explains the designation for the Compact 2 KME product, using this same format.

TT/SWH page	Final Product Information Compact 2 KME	BBT THERMOTECHNIK GMBH Bosch Group
Menu	Designation	
Intro		
What is C2 KME?		
Benefits <ul style="list-style-type: none"> <li>Installer</li> <li>End User</li> <li>USP's</li> </ul>		
Product Range		
Designation		
Features <ul style="list-style-type: none"> <li>Technical</li> <li>Dimensions</li> <li>Display</li> <li>Design</li> </ul>		
Regulations & Environment		
Pricing Guidelines		
Market Introduction Plan		
Competition		
FAQ's		
Contacts		

example (Junkers) : Compact 2 KME 11 L with LCD



*Designation for Compact 2 KME*

The number of items in a technical specifications for a product such as a water heater is vast, so the Product Manager has to select the few most relevant ones (mainly for commercial and positioning purposes) to present to the markets. Here's an example for Compact 2 KME:

TT/SWH page	Final Product Information Compact 2 KME	BBT THERMOTECHNIK GMBH Bosch Group
Menu	Technical Features	
Intro		
What is C2 KME?		
Benefits <ul style="list-style-type: none"> <li>Installer</li> <li>End User</li> <li>USP's</li> </ul>		
Product Range		
Designation		
Features <ul style="list-style-type: none"> <li>Technical</li> <li>Dimensions</li> <li>Display</li> <li>Design</li> </ul>		
Regulations & Environment		
Pricing Guidelines		
Market Introduction Plan		
Competition		
FAQ's		
Contacts		

**Temperature control:** Hydraulic modulation  
**Max. Output (L):** 11\* - 14\* - 17\* l  
**Flue connection:** Chimney (B22) – Ø 95 mm  
**Ignition Type:** WR type: E, WRD type: E  
**Gas volume selection:** 7 positions knob  
**Gas Types:** LPG, NG  
**Water valve material:** Polyamide  
**Security devices:** Flame failure device  
 Temperature limiter  
 Pressure switch  
**Efficiency (%):** 86  
**Dimensions (w x h x d mm):**  
 11L: 310x580x220  
 14L: 350x655x220  
 17L: 425x655x220  
**Fan\*:** 32W / 240 v  
 35W / 120 v



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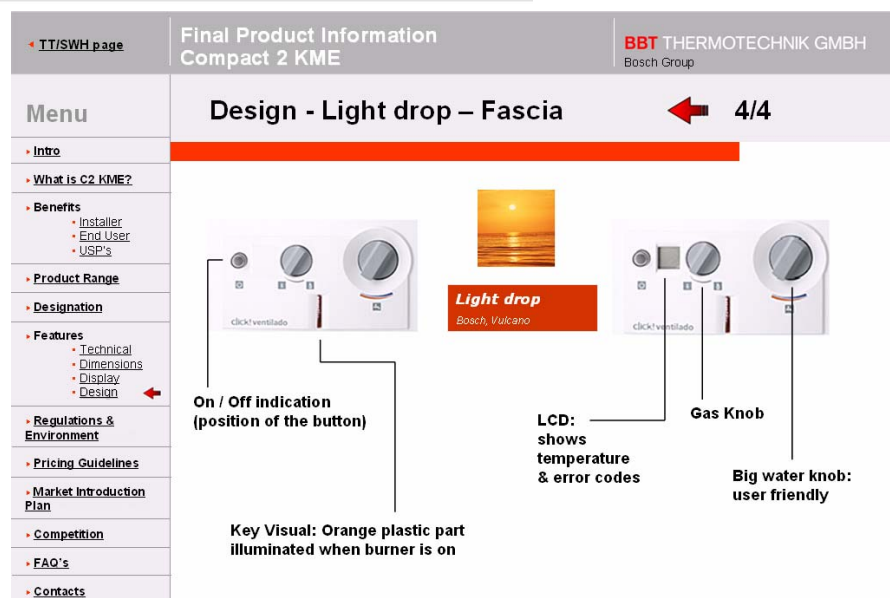
\* depending on country

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*(relevant) Technical Features for Compact 2 KME*

As you can see, in this case the most relevant ones would be how the water temperature would be controlled, the maximum output, the diameter and type of the flue connection, ignition type, the number of gas volume selection positions, which gas types the product works with, the material of the water valve, the main safety devices, the efficiency, dimensions and voltage of the electrical fan.

About design, because BBT has introduced a new Visual Brand Language, which includes a new design concept, it is necessary to highlight it in recent Product Information, hence the need for detailed description, such as the following:



*Design description on Compact 2 KME (light drop design, Vulcano brand)*

Competition overview plays an important role for the positioning of our product, for obvious reasons. Even though they are aware of it, sometimes it is useful to make sure we are comparing “apples to apples” so we also present to the markets the main competitor’s products who directly compete with our product. This helps them to come up with better sales arguments in our favour, and have a better understanding of the strenghts and weaknesses of the competitor’s appliances relatively to ours.

TT/SWH page

**Final Product Information**  
**Compact 2 KME**

**BBT THERMOTECHNIK GMBH**  
 Bosch Group

Menu

Competition

← 2/3 →

▶ Intro  
 ▶ What is C2 KME?  
 ▶ Benefits
 

- Installer
- End User
- USP's

 ▶ Product Range  
 ▶ Designation  
 ▶ Features
 

- Technical
- Dimensions
- Display
- Design

 ▶ Regulations & Environment  
 ▶ Pricing Guidelines  
 ▶ Market Introduction Plan  
 ▶ **Competition** ←  
 ▶ FAQ's  
 ▶ Contacts

	Fagor FEC- TD	Camif Britony Ventouse 13FF	Cointra CL- TA
<b>Output (L/min)</b>	11 & 14	13	11 & 13
<b>Output (kW)</b>	22 & 27.3	22.7	19.2 & 22.6
<b>Gas Types</b>	NG; LPG	NG; LPG	NG; LPG
<b>Dimensions (mm)</b>	567 x 310 x 230	890 x 400 x 280	838 x 360 x 206 838 x 360 x 248
<b>Display</b>	Yes	No	No

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### Competition Overview for Compact 2 KME (Iberian market)

During my internship I worked on the Product Information for nine products, including the new Solar Kit, the Compact 2 KME (shown here as an example), 2 new high output products for USA, electrical showers for Latin America and new electrical storage tanks. I also develop similar documents for the future generation of compact, solar and fan-assisted water heaters and even for the next boilers generation. It was very interesting for me and also very motivating to make another small contribution on the introduction of new products on world-wide markets.

## Six: Gas Water Heater (GWT) Technical Catalogue

Being a Product Marketing department, we also need to focus on how to highlight our products and on how to display them in the best way. For this, an international GWT Catalogue is almost mandatory, for commercial and technical purposes.

The need to replace our old and outdated catalogue arose from the introduction of new products, with new design (including the new BBT Visual Brand Language) and new features, with better technical descriptions. Also, the easiness to read and graphic layout needed to be improved.

This catalogue is destined to promote gas water heaters only, so electrical appliances were not considered.

This process was already in its conclusion phase when I arrived at SWH, and it was handed-over to me from the previous trainee.

During this final phase, I had direct contact with the agency who was producing the catalog, making the final fine tuning:

- correcting / rewriting the english texts
- deciding on colours, layout
- draft analysis and feedback

A lot of iterations, meetings, discussions and email exchanges later, the Catalogue was ready for production and distribution.

As a curiosity note: this catalogue was actually one of my best sources of information on product ranges, features, detailed technical aspects, internal product structure and markets during my internship, and I participated in its conclusion...

On the next page you can visualize some extracts from this catalogue.



## Extracts from the new BBT Gas Instantaneous Water Heaters Catalogue:

**BBT THERMOTECHNIK GMBH**  
Bosch Group

**Gas Instantaneous Water Heaters**  
Worldwide Product Range

**Solid Principles for a Solid World**

**Spreading warmth across the world**

**CECIMO** **NEFIT**

**steiger** **WORCESTER** **Vulcano**

**A World of Products**

**Our segments and product lines**

Our flow types for your installation requirements

It does not matter which conditions predominate when installing water heater appliances, because we are there after you the best choice.

- For installations where no shower is available and the need for more water is low (output 1.4 litres per sec. or 2.0 litres per min. in a system with gas pressure 10 mbar) - in a system with gas pressure 10 mbar - we offer the open flow type (type "OF").
- In flat and house with shower and a good draught, the open flow type (type "OF") is a good choice.
- In flat and house with shower but with a bad draught, the instant-on type (type "IO") is a good choice.
- For the replacement business in case conversion we also offer the instant-on type with well draft (type "IO").
- Some model appliances with the IO can be used in all situations (type "IO"). Thus, these water heaters deliver after the right solution.

Our range of ignition types and modulation enables an effective segmentation for all needs.

Additional to the flow types for different installation circumstances, there are several types of ignition and modulation that offer different levels of comfort for the end user.

In appliances without a power supply, the ignition range starts from the basic flow type (type "OF") through to the single burner flow type (type "IO") and the burner type (type "IO") up to the top frequency ignition (type "IO").

In power operated appliances you will find the electronic ignition (type "IO") and the electronic flow type (type "IO").

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**The right appliance for your need**

Classic (open flow) appliances, we now standardise in terms of components (burning the customer's request for higher output with another burner). The second generation of Compact appliances is coming to market. It will be an extension of the second concept, offering a full range of appliances with new features such as a display indicating the output temperature and the water code.

The water code is a code for a specific amount of hot water. This means the output depends upon the range selected, e.g. 10 litres per min. for 10 minutes, for instance, for a further risk up to 14 litres per min. to provide a whole shower.

To complete these different needs, we have defined our new model segments based on the output (litres) of the appliance. The first segment for a low output unit, the Compact Segment for medium output, and the High Output Segment for high output.

One step ahead

At Vulcano, our R&D product managers and development engineers are specialised for segments to have a clear focus on different customer needs and market requirements.

This segmentation helps defining and developing the most appropriate product in each segment and for each market in line with market trends, as well as customer requirements and needs.

In the basic segment, priority is given to the ease of use and affordability of the products, to full range requirements of comfort and safety in delivering hot water for particularly price conscious markets.

As the water use, the comfort segment is focused on delivering the highest standards of hot water comfort and convenience.

In the comfort segment, the flow Compact generation launched in 2005, which was replacing the existing

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**A World of Products**

**Your need - our solution**

**Classic**

For better information on these appliances, please visit our website [www.bbt.com](http://www.bbt.com) or contact us at [info@bbt.com](mailto:info@bbt.com).

**AS Family**

**Compact Family**

**Classic Family**

**World Family**

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**A World of Products**

**The Compact Family - small appliances, high output**

In the Compact segment, the Compact Family has been developed and designed to meet the needs of customers requiring an open flow appliance with built-in high output and compact dimensions when the space for the installation is limited.

With the modern dimensions in its compact design, it provides the largest range of output (1.4, 1.6 and 2.0 litres per min.) in the market.

The efficient design of the Compact Family, when compared to the previous design, allows the installation in less than 10 minutes for the flow installation. This solution does not only require less construction and installation but also contributes to a more efficient installation of the gas pipe.

Compact Light slim front panel design (1.4 L) Compact Thin front panel design (1.6 L)

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**A World of Products**

**Special features and devices**

**Direct Tapping**

When a direct tapping solution is needed, Compact and Classic appliances offer an easy and comfortable option: a hot water tap which is able to be connected to the direct tapping system.

**First cold water in**

First cold water in, cold water supply for the appliance.

**Hot water for distance tapping**

Hot water for distance tapping, hot water from the appliance.

**KME-KR**

In case of flat and house with shower but also a bad draught, Compact appliances offer an additional draught required for a shower. This is provided by the KME-KR which connects the appliance to the KME-KR in flat and house with shower. This modification is a new way to increase the hot water supply to the top of the shower.

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**A Relationship Built to Last**

**Convincing arguments - the key for success**

- Our Product Diversity for your Uniqueness
- Innovative and Leading Standards
- Compact and Contemporary Design
- High Comfort Pattern
- Top Quality Level
- The Highest Safety Standards for Your Protection
- Environmentally Friendly
- Easy to Install and Maintain

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## Seven: Information on Showroom

The showroom of the Vulcano plant is of TT/SWH responsibility. The information and products that were displayed at the time of my arrival were outdated. Therefore, as a way to getting to know the products I was asked to prepare new posters with updated information. Here is one example of the nine posters I built up, with agreement from the respective product managers. This room is viewed by the entire factory and its purpose is to provide information about TT water heaters that are managed from the TTPO site. Also, it motivates workers and enlightens visitors, as the information is quickly absorbed and understood.

Esquentador (GWT) Segmento Comfort		Gas Water Heater (GWT) Comfort Segment	
<b>Celsius</b>			
- Câmara Estanque e Ventilado	- Room Sealed Fan Assisted	Produção Aveiro	
<p> Os esquentadores Celsius aliam a última tecnologia com o máximo de conforto para o consumidor. A modulação electrónica garante a estabilidade da temperatura da água, através da medição desta à entrada e à saída do aparelho. E o inovador sistema de regulação automática do caudal de água permite a economia de gás e água, evitando desperdícios.</p>			
<b>Tipo de Modulação</b> termostática	<b>Capacidade (L/min)</b> 11, 14	<b>Dimensões (mm)</b> 340 x 670 x 220 390 x 700 x 220	
<b>Sistema de Exaustão</b> ventilado e estanque	<b>Sistemas de Segurança</b> <ul style="list-style-type: none"> <li>• limitador de temperatura</li> <li>• sonda de ionização</li> <li>• pressostato</li> </ul>	<b>Peso (kg)</b> 20, 23	
<b>Tipo de Ignição</b> eléctrico		<b>Caract. Especiais</b> display digital, controlo remoto (ambos para Celsius Plus)	
<div> </div>			
<p> The Celsius appliances bring new features to the market and offer the highest possible warm water comfort. They guarantee a stable water temperature through an electronically modulated water valve which works according to the chosen temperature, and ensure a fast response while changing it.</p>			
<b>Modulation Type</b> thermostatic	<b>Output (L/min)</b> 11, 14	<b>Dimensions (mm)</b> 340 x 670 x 220 390 x 700 x 220	
<b>Flue Type</b> room sealed fan assisted	<b>Safety Devices</b> <ul style="list-style-type: none"> <li>• temperature limiter</li> <li>• flame failure protection</li> <li>• pressure switch</li> </ul>	<b>Weight (kg)</b> 20, 23	
<b>Ignition Type</b> electric		<b>Special Features</b> digital display, remote control (both for Celsius Plus)	
TT / SWH		BBT Thermotechnik GmbH	

Example of a product poster for TTPO showroom



## Bibliography:

- BBT Intranet
- Several Internet websites related to Water Heating Industry
- Internal company documentation

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