

A CASE STUDY IN
MARKETING MANUFACTURING INTERFACE:
STEEL PIPES AND TUBES FACTORY

MBA THESIS

BY

UMUT MERİÇ
JULY 1997

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**A THESIS
SUBMITTED TO
THE DEPARTMENT OF MANAGEMENT AND
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FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION**

**BY
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ABSTRACT

MARKETING-MANUFACTURING INTERFACE IN A TURKISH STEEL PIPES AND TUBES FACTORY

UMUT MERİÇ

M.B.A. THESIS

Supervisor: Assoc. Prof. Erdal Erel

Interfunctional harmony (cooperation, coordination and communication) between marketing and manufacturing in a steel pipes and tubes factory is analysed by a qualitative research tool in this thesis. Interfunctional harmony is important for an organization to be competitive, ineffective coordination and communication between departments can be due to several factors. Factory is chosen as the arena on which a detailed analysis is carried out to understand the factors that create conflicts between marketing and manufacturing departments and provides an empirical case study. Study named the disorders as marketing-manufacturing interface and concludes with the recommendations used in the future.

Keywords: Marketing, Manufacturing, Interface, Steel pipes and Tubes, Case Study

ÖZET

PAZARLAMA VE ÜRETİMİN KARŞILIKLI GİRİŞİMLERİNDE BİR VAKA ÇELİK BORU FABRİKASI

UMUT MERİÇ

M.B.A. Tezi

Tez Yöneticisi: Doç. Dr. Erdal Erel

Bu tezde, Çelik Boru fabrikasındaki fonksiyonların karşılıklı uyumu niteliksel bir araştırma vasıtasıyla analiz edilmektedir. Fonksiyonlar arası uyum organizasyonun rekabet edebilmesi açısından önemlidir ve bölümler arası yetersiz koordinasyon ve iletişim çeşitli faktörlerden kaynaklanabilir. Fabrika fonksiyonlar arası uyumsuzluğu yaratan faktörleri anlamak ve detaylı analiz yapabilmek amacıyla seçilmiş ve deneysel bir vaka olarak sunulmuştur. Bu çalışma uyumsuzlukları belirleyip gelecek için kullanılacak tavsiyelerle sonuçlanmaktadır.

Anahtar kelimeler: Pazarlama, Üretim, Karşılıklı Girişim, Çelik Boru, Vaka.

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I. INTRODUCTION AND LITERATURE REVIEW

Important functions of a typical industrial goods company are finance, marketing, production, R&D, accounting and human resources. Recent scientific evidence suggests that, firms are more successful if their functional groups communicate with one another effectively. Porter(1985) presents a framework to see the series of activities a firm performs to provide a product to its customers (see Figure 1). It is possible to see the importance of marketing and manufacturing departments since all of the primary activities are part of those two departments. The product success is enhanced if these departments share information on customer needs, segments, technology, manufacturing capabilities, competitor strategies and business itself.

The only organizations with high percentages of successful projects and sales derived from new products were those integrating technological sophistication and market orientation to develop products with differential advantages for strategic segments. Hayes and Wheelwright(1984.) contend that “the marketing manufacturing interface is the focal point of much more frequent and heated disagreement than occurs between other pairs of functions”. Marketing department identifies target customer segments, selects product mix and establishes pricing, promotion, distribution and service policies. Briefly, it deals with strategies to generate demand for the products of the company. Conversely, basic principles support the contention that manufacturing goal structure centers on supply regulation. Manufacturing department makes decisions on capacity expansion, layout and location of facilities, process technology, quality control processes, inventory and purchasing.

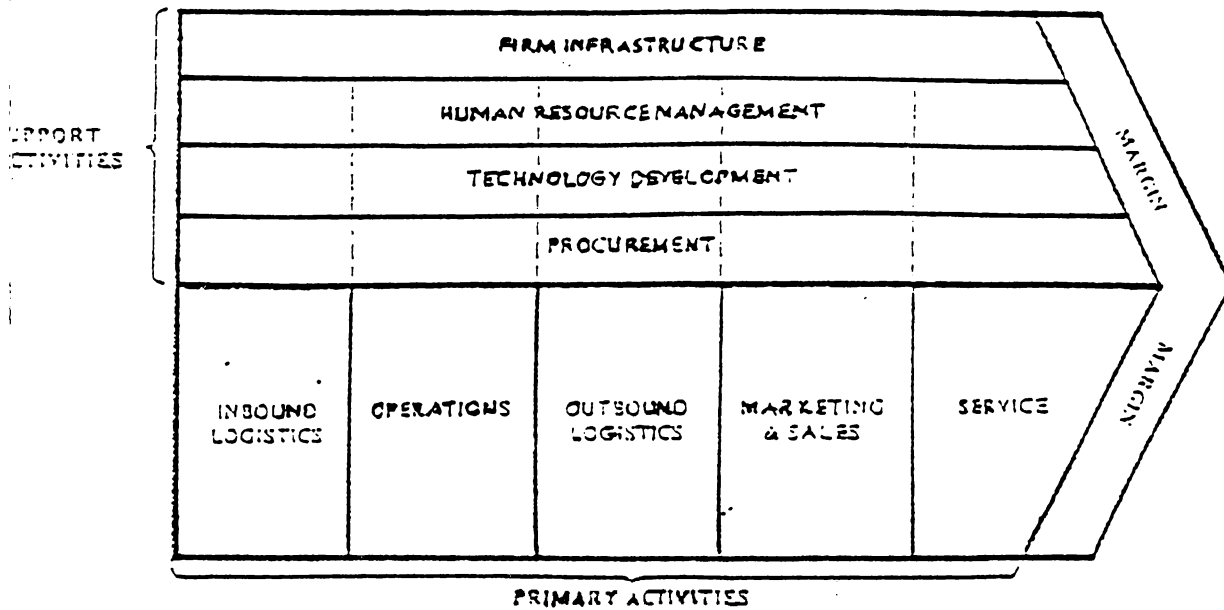


FIGURE 1

The Value Chain

Source: Porter M., Competitive Advantage: Creating and Sustaining Superior Performance, New York: Free Press, 1985.

While such decisions are often made independently, the two functional areas overlap on the issue of the product in the firm as portrayed in the following figure.(see Figure 2)

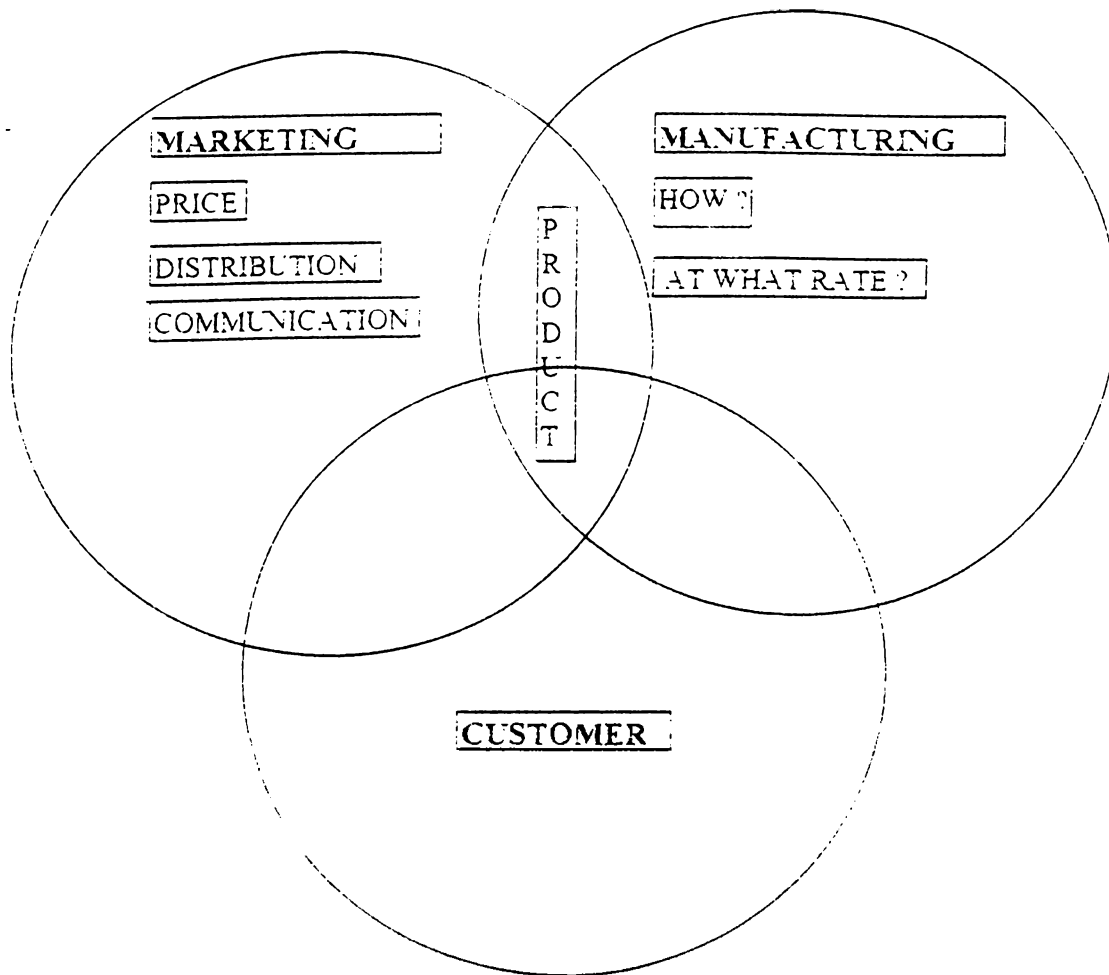


FIGURE 2.

Marketing- Manufacturing Overlap

Harmony is important to product success though it is difficult to achieve. If we examine the barriers preventing functional interaction, we find several factors about it. The perceptions of the different groups in the company differ both on their levels of involvement and on the value of information they each provide to the project. For example, marketing perceives that it provides more information to Research and Development than Research and Development provides to marketing. In addition to this, each function resides its own "thoughtworld", engineers speak in their own language, hopefully that of the customer and operate in a customer oriented culture. These separate thoughts led to a lack of agreement between marketing and production departments.

In industrial organizations, manufacturing and marketing groups are charged with managing most of the essential activities and make many decisions that have important implications for competitive performance. Although the activities and responsibilities of manufacturing and marketing groups are fundamentally different, they are highly interdependent. As Mc Cann and Galbraith(1981) have noted, the actions taken in one department may affect the goal accomplishment of the other department which ultimately influence the performance of the overall business. The degree of coordination achieved between the departments is important for organizational effectiveness. In addition to this, a ten year study of 289 projects by Souder (1986) demonstrates that interfunctional harmony(cooperation, coordination and communication) is a strong correlate of new product success.

The departments of marketing and manufacturing are relevant and important starting points because their interrelationship is often described as conflict-laden. This interdepartmental

conflict can be due to the diverging philosophies of the two departments. Because of the diverging philosophies, marketing and manufacturing groups have differences over goals, resource needs, reward structures, performance measures, employees, product experiences, production process experiences and customer market experiences. Generally we can say that, the conflict between groups may result from separate training experiences, unique work characteristics and distinct personalities of individuals who pursue careers in these departments. Studies provide certain evidence that there may be certain areas where marketing and manufacturing disagree on goals and the characteristics of the product line, production process and market. Furthermore, marketing and manufacturing groups appear to accept a common set of guiding precepts concerning quality, on time performance, broad line of products and improved profitability, the two groups disagree on the underlying approaches to instituting these precepts.

In the short run, manufacturing depends on marketing for information about what, how much and when to produce. Manufacturing, then supplies products for marketing to price, advertise, merchandise and distribute. In the long run the interdependence between groups can manifest itself through a variety of decisions such as the following:

- Capacity expansions and planned capacity utilisation
- Investments in new technologies for manufacturing
- The development of new products
- Availability of new products
- Target quality levels
- Breadth of product line
- Distribution effectiveness

These interrelated short and long run decisions create a pattern that will ultimately determine cost structure, quality and service reputation.

These overall pattern of decisions reflect the competitive priorities of the firm. That is imperative that marketing and manufacturing groups decide on courses of action that are consistent with each other and the strategy of the business. These groups adopt courses of action that are inconsistent with each other or with the rest of the experience noted that it is desirable for manufacturing and marketing groups to agree on where the organization trying to go and how that choice of direction should influence ongoing decision making strategies.

Making decisions that reflect the competitive needs of the firm is not easy. On a daily basis, marketing and manufacturing managers are confronted with difficult situations that require them to make decisions concerning trade-offs among competitive priorities. When a decision is made that is inconsistent with the organization's competitive priorities, efforts are diluted and performance may suffer. For example, when a good customer requests a rush order, business line managers are faced with a trade-off decision: Should service to that customer take priority over the need to keep schedule changes and overtime down? This action will work to create a cost conscious organization which is more apt to offer customers a low price. Either choice may be competitively feasible under the proper industry conditions. But marketing manufacturing must agree on the choice. If marketing is promoting the company as customer responsive when the manufacturing infrastructure is not prepared to make the tradeoffs necessary to support a high level of responsiveness then a basic inconsistency exist that will undermine the organization.

Shapiro(1977) elaborated on the problem of marketing manufacturing conflict and identified several areas where the two groups need to agree but frequently do not. It is in these areas of interdependence that many of the marketing manufacturing trade off decisions occur.(Figure 3).

Capacity Planning and Long range Forecasts: Manufacturing needs forecasts of aggregate market demand in order to decide how much capacity to build and what kind of equipment to add. Since forecasts are often wrong, capacity and equipment additions usually do not match demand exactly. When capacity is too low, marketing is faced with lost sales. When capacity is too high, manufacturing is faced with high costs and an underutilized facility.

Production Scheduling/Short-range sales forecasting: Frequent changes in production schedules may reverberate the system, causing missed shipments, backlogs, and wide swings in inventory levels. On the other hand, quick responses to the special needs of customers may be an important competitive priority.

Inventory and delivery: Manufacturing wants to use inventories to smooth production and lengthen runs while marketing wants to use inventories as a way of insuring fast customer delivery.

Quality assurance: Manufacturing may be using quality standards or quality monitoring procedures that do not measure the true parameters of quality from the customer's point of view. When marketing wants to add features and options to product designs, inspection procedures become more complicated and more expensive.

Breadth of product line: While marketing wants to provide a broad product line as a way of increasing sales, increasing market share, improving reputation as a full line supplier, and improving customer responsiveness, manufacturing may want to keep the product line narrow as a way of keeping inventory, set-up, and change over costs down.

Cost Control: When manufacturing costs are high, marketing may blame manufacturing for not reducing costs to allow use of flexible pricing as a strategic marketing tool. On the other hand, manufacturing may blame high costs on marketing demands for a broad product line, high quality and fast delivery.

New product introductions: New products require new processes and new equipment that make the manufacturing operation more complex and difficult to control. However, new products are one of the major tools marketing has for increasing sales and profitability.

Source: Shapiro, B.J. "Can Marketing and Manufacturing Coexist" Harvard Business Review,

September-October 1977.

FIGURE 3

Areas of Marketing-Manufacturing Interdependency

II. MARKETING MANUFACTURING INTERFACE

According to Crittenden, Gardner and Stam(1993), company observations reveal three major conflict areas between marketing and manufacturing. These are;

- 1.) managing diversity
- 2.) managing conformity
- 3.) managing dependability

Figure 4 shows the conflict areas between marketing and manufacturing. The following discussion is heavily based on these conflict areas.

II.1. Diversity Management

The most important concern of the marketing department is customer satisfaction. Producing a diverse array of products is often a requirement of meeting customer demand. Customers require products that vary in shape, size, flavour and other dimensions. The company makes decisions about the number of items in a line, the number of different product lines to offer, building to customer specification, modifying existing products and eliminating/adding products. Hayes and Clark(1985) referred to the managerial actions related to these decisions as “confusion engendering activities”; the confusion is caused, for example, by varying production rates, expediting orders or changing production specifications.

II.1.1. Length of Product Line : In order to satisfy the various desires of many customers, firms typically want to sell products consisting of many models and several lines since a

product offering often results in a loss of sales due to customers buying from a competitor with a full line of products.

<u>Area of Conflict</u>	<u>Marketing Objective</u>	<u>Manufacturing Objective</u>
<u>Managing Diversity:</u>		
1. Product line length/ breadth	Many and complex models	Few and Simple Model
2. Product customization	Customer specifications	'Stock' products
3. Product line changes	Product changes	Planned
immediately; high risk	only necessary changes	low risk
<u>Managing Conformity:</u>		
4. Product scheduling	Constant change	Inflexible
5. Capacity planning	Accept all orders	Critically evaluate "fit" of orders
<u>Managing Dependability:</u>		
6. Delivery	Immediate; large inventory	As soon as possible; no inventory
7. Quality control	High standards	Reasonable control

Source: Crittenden, V.L., Gardiner, L.R., Stam, A., "Reducing Conflict between Marketing and Manufacturing" *Industrial Marketing Management*, 22, 1993

FIGURE 4

Conflict areas between marketing and manufacturing.

On the other hand, manufacturing prefers narrow product offerings because long production runs associated with narrow product offerings, allow manufacturing to lower costs because of economies of scale and to spend less time and dollars on changeovers. Long production runs, however, go against marketing's desire for variety since product variety frequently requires stopping the production process to adapt to a different design.

II.1.2. Customization of Products: Marketing continuously works for product modifications to satisfy the changing desires of customers. Manufacturing, on the other hand, generally prefers building standard products since even the smallest change affects the production process and possibly, the equipment used. Therefore, the costs associated with product customization may outweigh the benefits. Time lost for changes of processes and added departmental work decreases production and causes reduced output of standard products. Attempting to produce both standard and customized products present significant production problems for many companies.

II.1.3. Changes in Product Line : Adding or deleting products from a product line is the job of marketers. There is usually a conflict between marketing and manufacturing when marketing wants these product line changes and manufacturing provides them. Changing demands of the customers often force marketing to request immediate changes on the current line.. However, adding products commonly requires major technological changes, a long lead time to get the necessary raw materials, or changes in the production plan. Similarly, when dropping a product from the product line, manufacturing tends to want to use all of the raw materials in stock before

suspending production. Companies spend vast amounts of time and money to develop or modify products to have marketplace. Also, needs change suddenly. While marketing is praised for early recognition of these changes, manufacturing is often left with unused production lines and excess inventory.

II.2. Conformity Management

While marketing tries to generate demand for a product, manufacturing is responsible for making the product available. In the short run, manufacturing manages the transformation process through its production schedule. In the long run, manufacturing manages the process with decisions concerning capacity and facility planning.

II.2.1. Production Scheduling: Conflict between the manufacturing and marketing is common due to the scheduling of production. For marketers, output can be fluctuated, increased or decreased immediately so they tend to submit imperfect forecasts, accept last minute orders, and promise short lead times. But the production schedule, once made, can be very inflexible. Marketing department submission of imperfect forecasts, partially resulting from not selling on a contractual basis and a lack of clear purpose in offering promotions, makes it almost impossible for manufacturing to fulfil commitments to customers.

II.2.2. Capacity Planning: Another important conflict creator between marketing and manufacturing is the issue of capacity planning. At any given time, there are limits to the quantity of products a firm can produce. But, to meet sales goals or gain market share, marketers

often wants to accept all orders. This typically takes a significant amount of time and expense to make major changes in a firm's manufacturing capacity.

II.3. Dependability Management

Actions of both departments are necessary to manage dependability. Conflicts occur related to delivery and quality control. Marketing wants rapid delivery and high standards. However, rapid delivery may mean that manufacturing has to maintain a large inventory.

II.3.1. Product Delivery: As a part of customer service, late deliveries are a sign of poor service, resulting in customer dissatisfaction and lost sales. Manufacturing, on the other hand, may think that marketers promises meaningless delivery dates to get the order and blames marketing for not consulting the production schedule before making delivery promises.

II.3.2. Quality Control: Marketing frequently expects manufacturing to produce the "perfect" product, while manufacturing believes that it is doing the best it can given the complexity of the product, the constant production changes, and the number of products it is expected to produce.

It is expected that, manufacturing produces only what marketing needs; marketing promises only what manufacturing can produce efficiently. The overview of potential conflict areas, however, refutes this optimistic view of the nature of marketing manufacturing interdependence.

II.4. Objectives and Thesis Outline

As it can be seen most of the studies investigate the interface between marketing and manufacturing, theoretically. They either identify conflict areas, the causes of the conflict and ways to solve them, or develop a framework to optimize the relationship between marketing and manufacturing in a single potential conflict area. The important thing is that, these studies are not proven by an empirical case study.

In this study, I used a framework to identify the gaps in different dimensions of the marketing manufacturing interface and I tried to determine the factors that effect these gaps based on earlier studies in this field. I focused on an industrial producer, namely, a steel pipe manufacturer in order to conduct this research.

In the following sections, the measures of the gaps between departments will be given as GAP1, GAP2, GAP3, GAP4. Also, the validity of the hypotheses developed by Akıncı(1993) was also tested in the company by using a survey instrument to investigate the marketing-manufacturing interface.

Then, research methodology and an overview of the steel industry in the world and in Turkey are summarized.

In analysis part, findings of the interviews that are conducted in the company are examined and the data that are obtained from quantitative research tool developed by Karabatı and Paşa(1991) are analyzed and used for the measurement of gaps cited earlier(Akıncı,1993), and for valuable recommendations.

II.5 MEASUREMENT OF MARKETING MANUFACTURING INTERFACE

A recent research by Akıncı(1993) provided a framework that shows the gaps in marketing manufacturing interface at the operational level (Figure 5). Also, this research explains the gaps between these departments as:

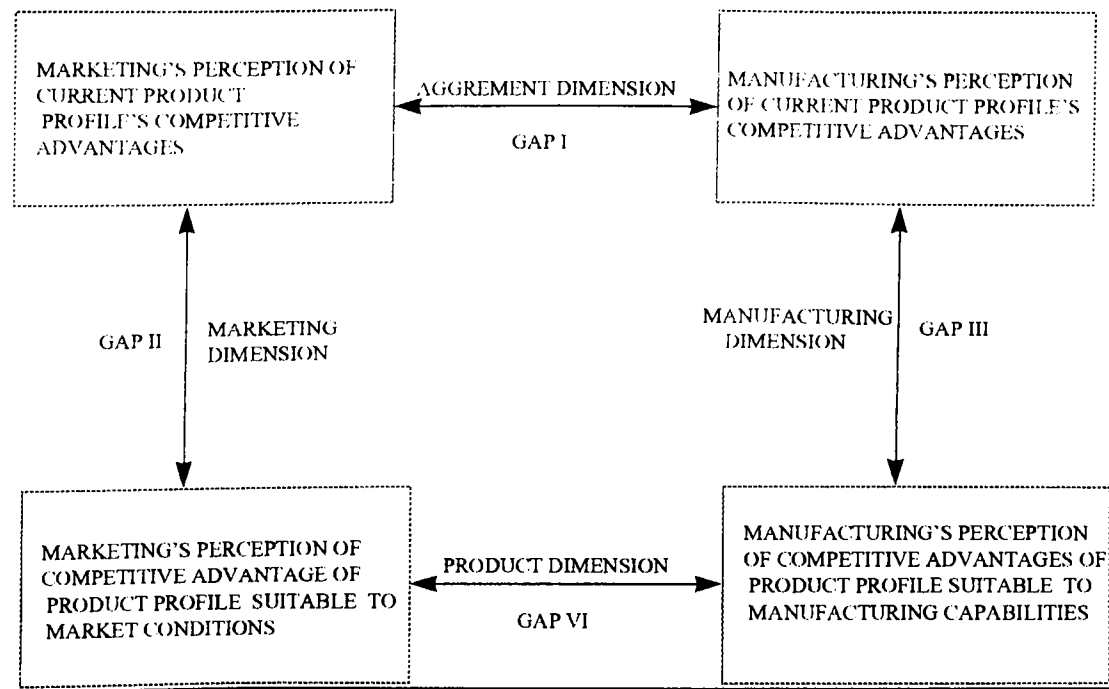
GAP 1: The difference between the competitive advantages of the current product profile perceived by marketing and manufacturing people.

GAP 2: The difference between the competitive advantages of the current product profile and the product profile that is suitable to market conditions, perceived by the marketing people.

GAP3: The difference between the competitive advantage of the current product profile and the product profile that is suitable to manufacturing capabilities, perceived by the manufacturing people.

GAP 4: The difference between the competitive advantage of the product profile suitable to market conditions and of the product profile that is suitable to current manufacturing capabilities.

The factors that affect these gaps were developed as hypotheses in the same study and were grouped as industry specific and firm specific factors. Industry specific factors are the instability in the industry and the task environment, defined by customers, competitors, suppliers, labor union and government.



Source: Karabatı, S.; Paşa, M” Pazarlama ve Üretim Birimlerinin Karşılıklı Uyumu”,
 Faculty of Management of Bilkent University, 1993.

FIGURE 5

Gaps in the Marketing and Manufacturing Interface at the Operational Level.

The firm specific factors contain the organizational strategic type, understanding the objectives of the company, having right operational implementation and organizational climate.

(see Figure 6)

This study takes a qualitative approach to analyze the factors influencing the marketing manufacturing interface, attempts to develop a survey instrument for this purpose, while applying it to a business organization to provide an empirical example

Industry specific factors:

1. The instability in the industry will increase GAP2 and GAP4.
2. In an unstable environment, the companies that have adopted flexible manufacturing technology will have smaller GAP4 than those who do not employ flexible manufacturing technology.
3. More the industry supports the companies, smaller the GAP2,GAP3 and GAP4 will be in these companies.

Firm specific factors:

1. The company that possesses more defender strategic type characteristics will have smaller GAP1,GAP2,GAP3 and GAP4.
2. Having higher formalization within a company will decrease GAP1 and increase GAP2,GAP3.
3. The concentration of decision making authority will increase GAP1,GAP2,GAP3.
4. Employee participation in decision making will decrease all of the gaps.
5. The joint reward system will decrease GAP1.
6. The increase in departmental communication and cooperation will decrease GAP1,GAP2,GAP3 and GAP4.

Source: Akinci, H.B., "Determinants of the Marketing-Manufacturing Interface."

Thesis report-Faculty of Management of Bilkent University, 1993.

FIGURE 6

Factors that affect the gaps in the Marketing-Manufacturing interface at the Operational level

In the questionnaires, competitive advantages are stated and each interviewee in the marketing and manufacturing departments rate on a scale from 7 (most important) to 1 (least important) according to the given criteria. These advantages, stated by Hill (1991), are as follows: production according to customer specifications, wide range of products, new product introduction, fast lead times, product reliability and durability, on time delivery, low price, after sales service, product with modern technology and ability to handle various order sizes. The questionnaires can be seen in Appendix A. Each interviewee makes two ratings. An interviewee from the marketing department makes the first rating by considering his/her perception of current product profile's competitive advantages and the other rating by considering the competitive advantage of product profile suitable to market conditions. Similarly, an interviewee from the manufacturing department gives the rates by considering the perception of current product profile's competitive advantage and also competitive advantage of product profile suitable to manufacturing capabilities.

In calculating the gaps, the sum of the absolute value of the differences between the perceptions is divided by sixty since the maximum difference from the 10 different criteria, each of which is rated on a scale from 7 to 1 and has a maximum difference of sixty. Therefore:

GAP 1 is equal to division of the sum of the absolute differences in perceptions of the marketing and manufacturing people about the competitive advantages of the current product profile, by sixty.

GAP 2 is equal to division of the sum of the absolute differences between the competitive advantages of the current product profile, and of the product profile that best fit to current market conditions and marketing practices, perceived by marketing people, by sixty.

GAP 3 is equal to division of the sum of the absolute differences between the competitive advantages of the current product profile, and of the product profile that best fit to current manufacturing capabilities , perceived by manufacturing people, by sixty.

GAP 4 is equal to division of the sum of the absolute differences of the characteristics of the product profile that best fit to current market conditions and marketing practices, by sixty.

III. RESEARCH METHODOLOGY

This research is conducted to investigate and determine the level of agreement and disagreement achieved between marketing and manufacturing groups by focusing on several factors. It is very useful to find major conflict areas in a company to increase the organizational effectiveness and product success. One of the leading manufacturer of steel pipes and tubes in Turkey is selected as the arena of the study.

A qualitative methodology is used in order to understand the main factors that affect marketing and manufacturing conflict. Series of interviews are conducted from top level of the company to lower levels including marketing, manufacturing and other functional managers. Additionally, questionnaires that are developed by Department of Management of Bilkent University(given in Appendix A) are used to collect data. The results are used for the measurement of the marketing and manufacturing interface gaps mentioned in the research conducted by Akıncı.(1993) .

In these interviews a checklist of subjects that is developed by Gezer(1994) are used to conduct the discussion with the interviewees efficiently. This list can be seen in the Appendix B.

Interview scripts of interviews that are conducted in the company are given in Appendix C.

IV. CASE STUDY

In order to understand the existence of gaps between marketing and manufacturing departments, the biggest manufacturer of steel pipes and tubes is chosen. Research is conducted by using qualitative and quantitative tools together.

IV.1. Steel Industry in the world and Turkey

The steel pipe industry in the world suffers from excess capacity and competition. There has been a marked decrease in the production and sales of steel tubes in the EU in recent years which resulted in a 30% employment reduction in the last ten years. Although there has been a steady, however small, increase in consumption during the same period, the increase has mostly been to the advantage of newly industrialised and developing countries. The EU, US and Japan suffered setbacks in terms of their shares of world production in the 1980's. Some newly industrialised and developing countries like Turkey, Mexico, Venezuela, Brazil, Argentina, Taiwan, Republic of Korea and Thailand have in the meantime continued to expand their capacities. In addition, the imports from the former Soviet Union were reduced due to lack of adequate hard currency.

In the short term, the issues that will concern market players will be production and sales strategies of producers in Central and Eastern Europe that tend to more concern over gaining hard currency rather than covering costs.

In the coming years, production capacity of the industry will continue to exceed domestic demand. No additional investments in the industry other than technology upgrading are anticipated. While the contraction in the economy may have a negative effect on capacity utilization in 1995 and 1996, measures to vitalize the overall economy through construction industry may benefit the pipe industry.

The substitute materials that penetrate the Turkish market in the last three years gained a considerable market share in the standard water pipes in small diameter category.

The most important development for the industry is the customs union with the EU in 1996 which helped the Turkish steel pipe producers to compete with players in the EU on the basis of technology and costs, but have to invest in some quality and productivity improvement programs. The advantage of the customs union for the Turkish producers is the removal of trade barriers.

IV.2. Steel Pipe Industry in Turkey

The production of steel pipes in Turkey started in the late 1950's. The industry grew very rapidly especially between the years 1975 and 1985, and many pipe manufacturing facilities were established, mostly in the Marmara Region. There are over 25 pipe production plants in Turkey, 19 of them are longitudinal or spiral welded pipe production plants. Only five of those producers have capacities over 100.000 tons. Appendix F shows the steel pipe manufacturers in Turkey. Borusan together with the new investments and the acquisition of Bosaş and Kartal Boru has reached an actual production capacity of 420.000 tpy at the end of 1995.

IV.2.A.Production

While capacity utilization rates differ, the average rate for the industry is around %65. Some producers manufacture their products by receiving orders from tenders and conduct regular production programs. But, their production level is kept at minimum at other times. Total pipe production between 1991-1994 is given in Table 1.

Table 1

The total pipe production in Turkey in the last four years.

Pipe production	1991	1992	1993	1994
Welded (ktons)	610	610	625	650
Seamless (ktons)	3	5	5	6.5
Other (ktons)	0	0	0	0

Source,Borusan Prospectus, 1994

IV.2.B.Cost Structure

In the pipe industry, the most important cost item is raw material. As of 1995 year end, the share of raw material costs in overall costs was around 60-70% for water and gas pipes, 72-75% for structural tubes and sections, and 62-65% in oil pipes . The figure is 58-60% on average for spiral welded pipes while it is 45-47% for seamless pipes. Another cost item is overhead allocated per ton of output due to low capacity utilization. Other cost factors, such as labor,

indirect material, and energy are generally considered to be commensurate with the EU levels: Increase in wages after 1990, in addition to the relatively higher cost of electricity as compared to the EU appear to be disadvantages in exports. However, the current contraction in the Turkish economy reduced real wages in 1994-1995 and beyond.

IV.2.C. Domestic Sales

Domestic consumption of steel pipes is related to the overall economic conditions, infrastructure investments and especially on the construction industry. The steel pipe consumption per capita in Turkey is around 14 kg as compared to about 23 kg in developed countries. From that stand point there is a significant growth potential for steel pipe consumption in Turkey. The following table shows the domestic steel pipe consumption in Turkey.

Table 2

Domestic steel pipe consumption

((ktons)	1991	1992	1993
Welded	355	425	430
Seamless	63	65	65
Other	20	22	22
Total	438	512	517

Source, Borusan Prospectus, 1994

In addition to the above table, the domestic sales of welded pipes according to product type have typically been as in Figure 9.

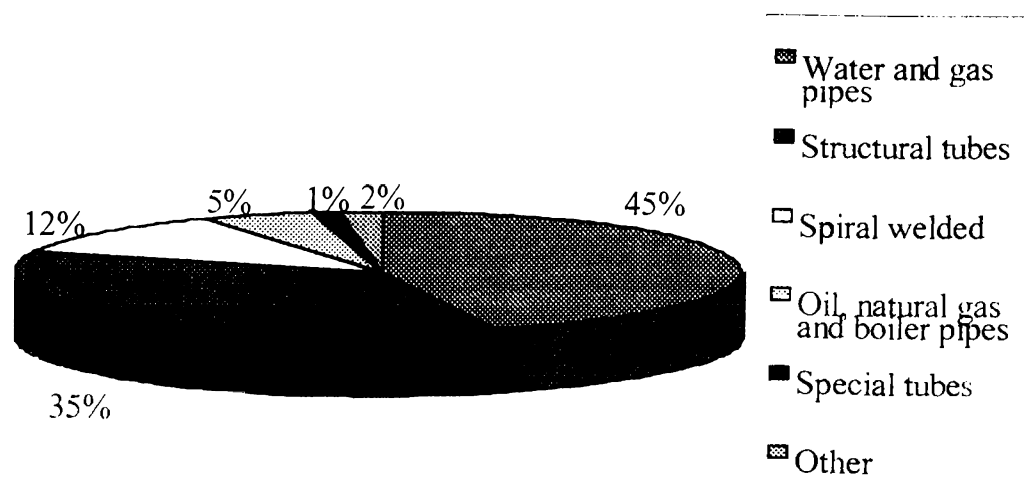


FIGURE 7

The domestic sales of welded pipes according to product type

IV.2.D. Exports

The steel pipe industry in Turkey enjoys significant export potential given its quality and cost parameters. From 1984 to 1990 the industry enjoyed a steady upward trend in exports.

The following table shows the steel pipe exports of Turkey for the years 1991-1992 -1993-1994.

Table 3

Steel pipe exports of Turkey

(1000 tons)	1991		1992		1993		1994	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
Welded	295	146.8	215	108.4	210	na	270	na
Other	0	0	0	0	0	0	0	0
Total	295	146.8	215	108.4	210	na	270	na

Source, Borusan Prospectus, 1994

IV.2.E. Imports

Due to the advantages gained from incentives and urgent demand, significant quantities of some product types are imported. The following table shows the steel pipe imports of Turkey for the years 1991-1992-1993

Table 4

Imports of Turkey

Imports(k tons)	1991	1992	1993
Welded	4	15	8
Seamless	60	60	60
Other	9	20	22
Total	81	95	90
Imports(\$ Millions)	71.2	84.4	79.3

Source, Borusan Prospectus,1994

IV.2.F. Domestic Competition

Although the market seems to be fragmented with 19 steel pipe producers in longitudinally welded pipes, only five large producers with production capacities over 100,000 tons determine market conditions. Distribution of domestic market share can be seen in the following table.

Table 5

Distribution of domestic market share

Borusan	% 32
Yücel	% 27
Mannesman	% 16
Erbosan	% 12.5
Kartal Boru(Borusan)	% 5
Other	% 4.5
Profil	% 3

Source, Zet Neilsen, 1995

Borusan is the leader in the market with around 40% market share. Yücel boru with similar production capacity has 27% market share and is active in the export market well. Sümerbank Mannesman is a semi-state owned company producing longitudinal and spiral pipes.

The companies find it hard to charge anything other than the on-going market prices although Borusan enjoys consistently higher sales prices than its competitors. Companies try to gain competitive advantage by reducing costs and differentiating products on the basis of size and quality.

V.3. The Company

The company that will be examined in this study is the leading manufacturer of steel pipes and tubes in Turkey. This job is the core business of the group, a conglomerate of 30 companies spread over eight different industries ranging from iron&steel to automotive spare parts to construction. The company has two manufacturing plants. One is located in Halkalı, İstanbul and the other in Gemlik, Bursa. Including these two plants, all companies share a common set of guiding principles which are productivity, innovation and environmental responsibility.

V.3.A. The Halkalı Works

The plant at Halkalı is set up on an area of 58.000 squaremeters, 20.000 squaremeters of which are covered. With an annual production capacity of 70.000 tonnes, the plant manufactures industrial pipes and tubes, open sections for the construction industry, refrigerator tubing, textile tubes, pneumatic and hydraulic tubes and high quality cold-rolled precision tubing. The plant has also a cold rolling mill with an annual capacity of 25.000 tonnes that includes pickling, strip annealing and skin pass units.

V.3.B. The Gemlik Works

Company's other pipe manufacturing plant located at Gemsaz, Gemlik, occupies a total area of 614.000squaremeters, 70.000 squaremeter of which are covered. Annual capacity is 300.000 tonnes. The product range includes black, galvanized and varnished water, gas and petroleum pipes and hollow sections. Products of the factories are given in Appendix E.

V. ANALYSIS

In analysis part, interviews conducted in the company are analyzed to examine the marketing and manufacturing interface. In addition to this, findings of the quantitative tool developed by Karabatı and Paşa(1991) are also examined and the hypotheses developed by Akıncı(1993) are compared with the findings of the interviews in the company.

VI.1.1 Marketing and Manufacturing Interface in the Company

All production work and marketing activities were conducted within the company by different departments and different locations. All production activity were done in the Bursa Gemlik Plant and in, İstanbul Halkalı Plant, but the marketing and export departments were located in the Central office in Karaköy, İstanbul. Manufacturing was only responsible for production and related activities, and marketing find customers, receive orders, give orders to manufacturing without looking to manufacturing current production capabilities.

According to some of the interviews in the company, several clues about the interface is obtained between departments such that a chief of production stated that “Although we, as manufacturers, have no capacity to produce seamless pipe, marketing friends receive orders to produce and export these pipes”. This statement shows that an inadequate information system and inexperienced personnel in departments causes faults and brings demotivation and unproductivity to the factory and in the long run profit losses.

Another important point that I focused is the different locations of manufacturing and marketing departments. They can not communicate with each other easily so that marketing people has not sufficient knowledge about technical specifications of the products and in the same way, production people has not have the marketing perspective. (In most cases, people from departments were only talking with phone). Shortly, it is possible to say that, each department can see the world by using their own glasses. Marketing people has not factory and production experience and manufacturing people has not marketing experience. Due to this, people from the two departments do not understand each other correctly and this is creating a communication gap between marketing and manufacturing. People of both departments also can not give importance to the ideas and recommendations of each other.

VI.1.2. Production Planning and Sales Forecasting

A sales forecast represents the attempt of the marketing department to describe the future demand for the products of the firm. This forecast then serves as the foundation for making decisions about production scheduling, capacity expansion, number of shifts. All of which influence delivery, reliability, and cost effectiveness. Without the best possible forecast from the group closest to the customer(marketing), manufacturing managers are forced to make decisions without critical information. Such a lack of information may lead to a variety of short-sighted trade-offs resulting in stock-outs, lost sales, poor delivery service, over production, high inventories, or excessive overtime costs. One of the most important area that creates conflict between marketing and manufacturing is the match of capacity planning and sales forecasting. In fluctuating economies like in Turkey, it is very difficult to forecast the demand due to ever changing markets. The marketing department faces so many problems to match the capacity of

the plant and the market. Long-term forecasts are not realistic and not preferred in the company. Instead, short-term planning procedures are conducted, starting from daily planning, weekly and monthly planning are done by examining the data that can be obtained from the marketing. Also, for new customers, planning can be done simultaneously.

As one of the chief of production has pointed out, due to the marketing department's laziness we are continuously dealing with the same customers in Turkey or abroad and not creating new markets. They can not see the potential areas that we will easily focus on and produce. Therefore, most of the times, if a new customer from abroad can find us and gives an order for a pipe, our current production is delayed and this new order was produced and delivered to gain the customer.

VI.1.3. Quality Assurance

One of the important quilling principle of the company is quality. Quality control starts with the raw materials used. To make sure raw materials conform to the specifications of the international standards, a series of physical and chemical analysis are conducted. The finished product goes through another series of tests to maintain exact company standards. Both departments give importance to quality as one production engineer said :

“ The reason that we export half of our annual production is the quality of our products known worldwide, and we have to do our best to increase our sales and market share.”

“Marketing people are getting orders to satisfy customers without exactly knowing the current capabilities so that we can not satisfy them with respect to quality and orders are coming back

from our customers. In some critical orders, we are also dealing with law and courts that force us to pay compensation in cases of unconformance to standards and late deliveries.'

VI.1.4. New Product Introductions

Developing a new product which is a steel pipe or a tube that have different physical or chemical characteristics, is possible by continuous R&D activities carried out continuously in the company. The company's R&D department is involved in several projects aimed at developing new products as well as improving the longlasting performance and quality of existing production. The product development program is oriented towards industry, and projects are based on careful study of customer suggestions. New technical developments are closely followed by means of an information network. Marketing and manufacturing people are regularly trained in new manufacturing methods and management techniques. However, they usually have problems in understanding and communicating with each other because they do not know the capabilities of each other and they are not sure whether the opposite side will succeed in what it has promised to do. According to the chief of production in the company, different locations of manufacturing and marketing can be the reason of this problem. The decision making authority at company is concentrated. For example, if a new product added or removed from the line or there are not major conflicts, decision making procedure is usually from top to lower levels and not all the parties that have stakes in production process included in decision making. As cited by Akıncı(1993), employee participation in decision making in the organization has a positive effect on the interface and the concentration of decision making authority will increase GAP's.

VI.1.5. Breadth of Product Line

Hundreds of products are produced in the company. Marketing and manufacturing departments want to increase the number of products to satisfy the increasing and changing demands of customers through R&D. (See Appendix E)

VI.1.6. Distribution

A company that operates in the global market must make a whole-channel view of the problem of distributing its products to the final users. Borusan has a strong distribution network with 78 nation wide dealers, 8 regional distribution companies all through the country and a direct sales organization. Some of the dealers were only dealing with the square and rectangular steel tubes, industrial steel pipe and precision tubes and only serve to manufacturers, industrialists and hardware manufacturers. In 1995 about 35% of the total sales are realised by regional distribution companies, 62% by dealers and 3% by direct sales. The company has controlling stakes in many of the regional distribution companies including; Boru ve Profil Ticaret A.Ş., Bozoklar İnşaat Malzemeleri Ticaret A.Ş., İmpa-Bursa İnşaat Malzemeleri Pazarlama A.Ş., Borusan Akdeniz İnşaat Malzemeleri Pazarlama A.Ş., Samsun Çelik Ticaret A.Ş., Gaziantep Boru Profil A.Ş., Borusan İnşaat Malzemeleri Pazarlama A.Ş.Kıbrıs. These regional companies and dealers collect and disseminate marketing research information about potential and current customers, competitors, and other actors and forces in the marketing environment and periodically send them to the direct sales organization of Borusan. For this reason, the company, unlike its competitors, prefers “selective distribution” by dissipating its efforts to fewer outlets to develop a better working relation with the selected middlemen and expect a better than average selling effort. To achieve this result, it offers adequate margins product training , and

promotional support to its distributors. Moreover, all the dealers are guaranteed against defective merchandise or price declines and their territorial rights are preserved when another distributor wants to dominate the territory of the other. As it represents a commitment to a set of policies and practices that constitute the basic fabric on which is woven an extensive set of long term relationships, management peevishly chooses the new channels (dealers) with an eye on tomorrow's likely selling environment as well as today's.

VI.1.7. Delivery

The delivery time for the Marmara region does not exceed 2 days where as it ranges from 2 to 7 days in the other regions. Another company from "Borusan Group Boru Nakliyat ve Ticaret A.Ş." is responsible from the delivery of all the products. The international shipments are carried out by a pier located near Gemlik Plant on the south-eastern coast of Marmara. The international shipments from the pier is under the control of another Borusan company; namely "Bortrans Denizcilik Hizmetleri A.Ş."

VI.1.8. Cost Control

Raw materials that are used in the production of steel pipes has the most important effect on cost. In production there are not much value-added activities and 65-70% of the product's cost is due to the raw material. The other part of the cost are labor cost, energy, management fees and expenses, tax, marketing expenses and profit. Profit margins are nearly 5-8% for different products. In order to lower the costs, raw materials can be obtained at a lower price . Whereas, if raw materials does not have the quality that is required to meet standards in Turkey or abroad, problems arise due to the product and in the long run, there is a possibility to lose customers.

Therefore, in reducing costs, a detailed analysis can be done and if it is possible, reductions are provided by either decreasing the energy or labor costs instead of raw materials. The product success is needed. Any failure in the products will have strong effects on the quality image of the company and effects its sales volume.

VI.1.9. Business Strategy

The strategy that can be seen in company is defined as a “defender” type by Miles et al (1978). The company tries to effectively serve its current products to its niche market. Although the company is a market leader in the domestic market with its products, it can not make any efforts to find new customers to develop its market. According to hypothesis cited by Akıncı (1993), companies that are possessing more defender strategic type characteristics, has positive effects on GAP's. Additionally, due to the low efforts to create new markets and customers, there is no need to produce completely different products. Therefore, flexible manufacturing technology is not adopted in the company. Akıncı(1993) says that “the companies that have adopted flexible manufacturing technology will have smaller GAP4 than those who do not employ flexible manufacturing technology”.

VI.1.10 Evaluation and Reward System

The reward systems based on the evaluation of the functional departments on the basis of different criteria often fail to recognize that marketing strategies will have an adverse effect on the production function and vice versa (Freeland 1980). Whereas if a joint reward system is used, the company will lessen the tension between its functional departments. In the company, job

evaluation and classification system developed by Hay Management Consultants Group are used. Employees at the same level have ranked within salary band according to the responsibilities that they have. This band has lower and upper limits consisting different benefits. Other than this, performance evaluations are done at least once in a year in the whole company. Employees are evaluated by their managers in terms of job quality, productivity, decision making and problem solving ability, ability to work as a team, responsibility and attitudes to company, to friends and to managers. Although there is a standard format and procedure for performance evaluations, as an engineer said, marketing and manufacturing people are evaluated separately and in fact, marketing people got more benefits than manufacturing either monetary or other. According to the hypothesis developed by Akinci(1993), the lack of a joint reward system is one of the reason for high magnitude of GAP1.

VI.1.11. Organizational Climate

In the factory, marketing and manufacturing people do not have much chance to meet and participate some social activities because of the different locations of the departments. Only with top management's efforts, some formal periodical meetings are arranged to increase communication between employees in a year. Manufacturing people in the factory organise some activities like touristic visits, sport tournaments and picnics. The same is true for marketing people in the central office. Due to the lack of communication between people, organisational climate has a negative effect on the harmony between departments. Therefore people of these departments have difficulty in understanding each others needs and thoughts.

VI.1.12. Organization Size

Considering the level of formal and informal communications in the company, size of the BBBF becomes an important determinant on the size of the gaps in the interface. It is known that relations in a large corporation are much worse than that of a smaller company. The Company has 3008 personnel including white collar and blue collar workers. Majority of personnel are working in the BBBF factory. So problems were a lot complicated and larger than that of a small company.

VI.1.13. Formalization

The level of formalization has also effects on the size of the gaps. There is not much informal communications between marketing and manufacturing departments and they do not understand each others needs and problems due to the different locations. According to the interviewees, as a necessity of ISO 9001 Quality Certificate, some certain procedures and standarts are used within the company. Most of the times, communications are formal due to these procedures. Akıncı(1993), in her thesis, says that “having higher formalization within a company will decrease GAP 1 and it will increase GAP 2 and GAP 3”. This is supported by the findings of the questionnaire in Figure 8.

VI.1.14. Stability of the Industry

According to marketing and manufacturing managers in the company, domestic market is defined as stable but economic fluctuations in Turkish Economy has a negative effect in the stability of demand. In fluctuating economies, sales forecasting and production planning becomes more

difficult and conflicts increases. Therefore, economic instability is taken as an environmental factor contributing to the interface.

VI.2. Measurement of the Gaps in the Interface

In this part, the results of the questionnaires that are conducted in the company's marketing and manufacturing department are analyzed and given in Figure 8. From that figure, it can be found that, marketing people have given the most importance to "product reliability and durability" as the competitive advantage of current products and the product profile that is suitable to marketing conditions. Moreover, "low prices" is determined as the least important competitive advantage for the current products and products that best suit to marketing capabilities by the marketing people. Manufacturing people have ranked "product reliability and durability", namely quality as the first "on time delivery" as the second and "production according to customer specifications" as the third important competitive aspect of the current product profile. Manufacturing people have also given the most importance to "production according to customer specifications" as the first and "on time delivery" as the second important competitive aspect of the product that is suitable to its machinery. In addition to this, "low prices" is taken as the least important competitive advantage for current product, and "ability to handle various order sizes" is taken as the least important aspect for the product suitable to its machinery.

Gaps of the Marketing and Manufacturing interface in the company is given in Figure 9.

This figure shows that GAP I and GAP II have the lowest ratings. This shows that the difference between the competitive advantages of the current product profile perceived by marketing and manufacturing people are lower than GAP III and GAP IV. The lowest rating can be seen in

GAP II. This shows that there is not much difference between the competitive advantages of the current product profile and the product profile that is suitable to market conditions perceived by marketing. GAP IV is related to perception differences between marketing and manufacturing functions has the largest rating. It shows the conflict between marketing and manufacturing groups about the ideal product.

FIGURE 8

Results of the Survey Applied at Company. (average ratings)

COMPETITIVE ADVANTAGE	MC	PC	MS	PS
Production according to customer specs.	4.61	5.81	5.3	6.68
Wide range of products	5.08	5.02	5.22	4.93
New product introduction	5.40	5.19	5.27	5.13
Fast lead times	5.11	5.5	5.07	5.26
Product reliability and durability	6.78	6.67	6.78	5.11
On time delivery	6.12	5.98	6.53	6.17
Low prices	4.57	4.68	4.68	5.23
After sales services	6.16	5.33	6.62	5.4
Product with modern technology	5.95	5.6	5.38	5.68
Ability to handle various order sizes	5.09	4.92	4.75	4.67

MC : Marketing's perception of current product profile's competitive advantage.

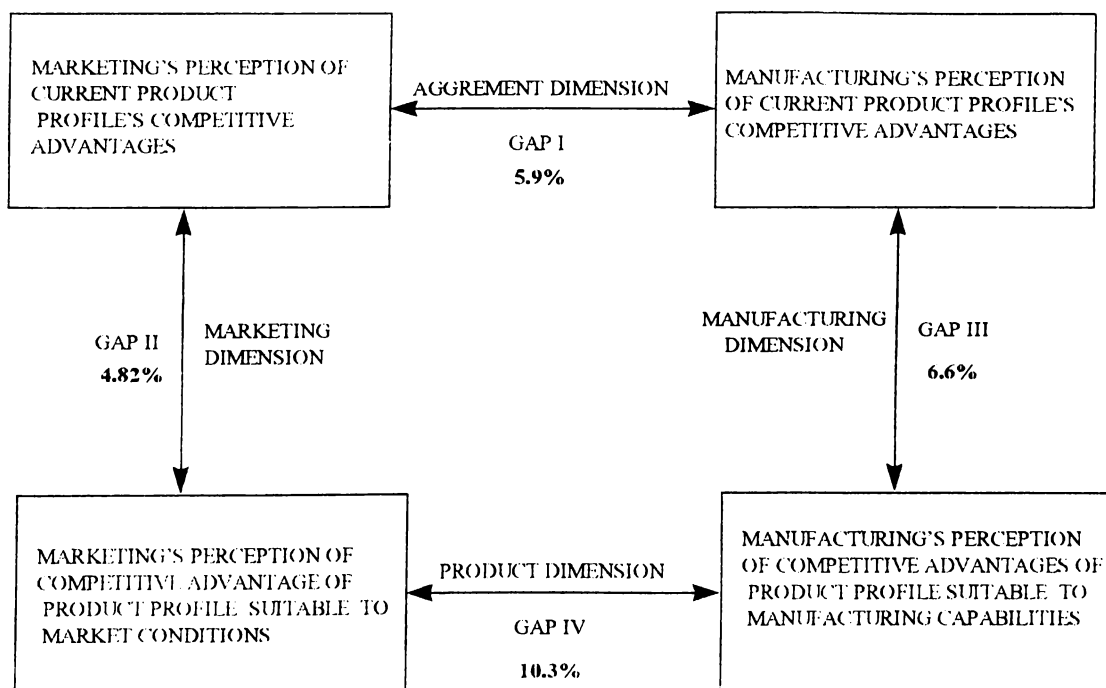
PC : Manufacturing's perception of current product profile's competitive advantage.

MS : Marketing's perception of competitive advantage of product suitable to market conditions.

PS : Manufacturing's perception of competitive advantage of product suitable to its machinery.

FIGURE 9

Gaps in the Marketing And Manufacturing Interface in the Company



VII. RECOMMENDATIONS

Successful firms require input and cooperation by all players in the firm. The tendency to box management functions so that manufacturing does not talk to R&D, R&D does not talk to marketing, marketing does not talk to manufacturing creates functions with lack of responsibility and void of interaction. Therefore, the company should improve the coordination between its key departments.

The interviews conducted in the company shows that departments can not understand the language of the other and also their goals. Briefly, each department uses their own thoughtworld. For such an organization First, it is desirable for functional groups to agree on where the organization wants to go and how that choice of direction influence the decision making. Second, committees and task forces that consist of members from each group should be formed and organized to manage the conflicts between departments. For example, marketing should develop its programs to take advantage of the company's manufacturing capability, that manufacturing adapt its capability in response to the needs of selected marketing segments and that top management emphasize approaches which can foster cooperation between the two functions.

As it can be stated earlier, marketing department works in a different building and location from manufacturing department. In most cases, this creates a lack of communication formally and informally. For important decisions that can be given by the participation of both departments, consensus can not be found due to the ineffective communications between departments. In order

to improve communication marketing should be in the same building with manufacturing group and informal communications should be encouraged by the top management by performing social activities. By this way, it will be possible to reduce the conflicts between departments and departments will understand each others needs and problems. .

Last year, management hired a person to train the employees for some sports and activities at the factory site to improve informal communication between employees.

This can be announced in the whole company and participation from central office should be provided such that, each department can understand that they are the parts of the whole.

Manufacturing people can see themselves as more important than the marketing part of the company, on the other hand, the same is true for marketing. As one production people said” If we can not produce , they can not sell”. Therefore, meetings should be organized to make them aware that all departments have different functions and importance for the company and they are the parts of the whole.

Another important conflict is due to the evaluations of marketing and manufacturing functions on the basis of different criteria. So a reward system, that takes into account the efforts of both departments for the whole production process, should be applied in the company in order to decrease the tension between those departments.

If a joint reward system should be used, there will not be differences between the perceptions of departments about the current product characteristics. Both departments will tend to think that the product has characteristics in favour of the criteria that their evaluation and reward system is based on.

Although the domestic market can be classified as stable, there are fluctuations in demand due to the unstable Turkish economy. Therefore, it is very difficult to make accurate forecasts in order to determine future demand and to make production scheduling. These processes should be conducted by examining all indicators in the environment and in the economy by checking the current production capacity and capability of the plant.

VIII. SUMMARY AND CONCLUSION

In this study, interfunctional harmony in a Turkish steel pipe factory, namely Borusan Birleşik Boru Fabrikaları is analyzed quantitatively by using a questionnaire developed by the Department of Management of Bilkent University. Qualitative data is collected by using one to one in dept interviews conducted from top level to lower level managers and employees to provide an empirical case study.

Many factors are considered as affecting the marketing and manufacturing interface and information obtained from interviews are matched with the findings of the quantitative analysis.

In the company, marketing managers perceive greater dependence on manufacturing whereas manufacturing managers perceive less dependence on marketing. This lack of interaction appears to be a key factor preventing the implementation of business strategy. For the company, as an industrial good manufacturer, it is expected that management has to rely on both departments but the findings show that manufacturing perceive themselves as more similar to marketing in terms of work, customer interaction, goals and reward structures. conversely, marketing see themselves as less similar and marketing department evaluated and rewarded in terms of different criteria. Therefore, full management commitment is necessary in order to convince one department for the importance of the other one.

Many of the areas of marketing and manufacturing interdependency deal with product, stock availability, production planning and forecasts, another important step in achieving the coordination between departments is to develop control systems to provide accurate, reliable information to the decision makers in key areas in departments. Use of control procedures (e.g. quality control) would seem to be a concern to manufacturing only, they provide a common base of information that serves as a starting point for defining the scope and source of shared problems.

The surveys carried out in the factory have shown that, one of the interdepartmental gap (GAP 4) is greater than the departmental gaps (GAP2 and GAP3). It can be concluded that, perception difference between the marketing and manufacturing functions is more than the difference within those groups in the company.

The case of Borusan , a manufacturer of steel pipes has shown that the awareness of top management about interface related problems and its commitment to resolving these issues are essential for reducing the interface gaps. Decentralization leading to a flatter, less bureaucratic organization structure with lower departmental borders also had a positive effect on the interface.

Interdepartmental communication, cooperation and coordination can also be improved by the management. As Shapiro (1977) stated that the companies that have practices to encourage interdepartmental cooperation will perform better. In order to overcome the tension between departments, mutual understanding between the marketing and manufacturing departments on potential problem areas were key to establishing the required harmony in the company.

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APPENDIX

A

QUESTIONNAIRES USED FOR MEASURING THE GAPS OF THE INTERFACE

Üretim Birimi Anketi: Bölüm 1

Sayın Katılımcı,

Bu anket, sizin şu anda mevcut ürünlerinizin rekabetçi üstünlük kazanma ve başarılı olma özelliklerini nasıl gördüğünüzü belirlemeye yöneliktir. Sırasıyla iki işlem yapmanızı rica ediyoruz:

1. Lütfen aşağıda verilen özellikleri şu anda mevcut ürünlerinizin rekabetçi üstünlük kazanmasındaki ve başarılı olmasındaki önemlerine göre sıraya dizin(yanlarına '1', '2', '3','10' yazarak). '1' numara en önemli gördüğünüz özellik, '2' numara ikinci en önemli özellik,'3' numara üçüncü en önemli özellik, vs. olacaktır.

2. Birinci bölümde yaptığınız önem sıralamasını göz önünde tutarak, şu anda mevcut ürünlerinizin rekabetçi üstünlük kazanmalarında ve başarılı olmalarında hangi özelliklerinin ne kadar önemli olduğunu belirtmenizi istiyoruz. Lütfen görüşünüzü aşağıdaki birden yediye kadar verilen çizelgeyi kullanarak belirtiniz. Örneğin, verilen özellik sizin ürünlerinizin rekabetçi üstünlük kazanmalarında ve başarılı olmalarında çok çok önemli bir yer tutuyorsa (7) numarayı, önemsiz ise (1) numarayı işaretleyiniz.

Üretim Birimi Anketi: Bölüm 1

Önem sırası	Rekabetçi üstünlük kazanma ve başarılı olma özelliği	Önemsiz	Çok Az Önemli	Az Önemli	Kısmen Önemli	Önemli	Çok Önemli	Çok Çok Önemli
		1	2	3	4	5	6	7
_____	Müşteri isteklerine (spesifikasyonlarına) göre üretim	(1)	(2)	(3)	(4)	(5)	(6)	(7)
_____	Ürün çeşitlerinin çokluğu	—	—	—	—	—	—	—
_____	Yeni ürünlerin sunulması	—	—	—	—	—	—	—
_____	Hızlı üretim	—	—	—	—	—	—	—
_____	Ürünün güvenilir ve dayanıklı olması	—	—	—	—	—	—	—
_____	Zamanında teslim	—	—	—	—	—	—	—
_____	Düşük fiyat	—	—	—	—	—	—	—
_____	Satış sonrası hizmetler	—	—	—	—	—	—	—
_____	Ürünün çağdaş teknolojiye sahip olması	—	—	—	—	—	—	—
_____	Değişik miktarlardaki talepleri karşılayabilme	—	—	—	—	—	—	—

Üretim Birimi Anketi: Bölüm 2

Sayın Katılımcı,

Bu anket, sizin şu anda mevcut üretim donanımınıza en uygun olan ürünlerin rekabetçi üstünlük kazanma ve başarılı olma özelliklerini nasıl gördüğünüzü belirlemeye yöneliktir. Sırasıyla iki işlem yapmanızı rica ediyoruz:

1. Lütfen aşağıda verilen özellikleri mevcut üretim donanımınıza en uygun olan ürünlerin rekabetçi üstünlük kazanmasındaki ve başarılı olmasındaki önemlerine göre sıraya dizin(yanlarına '1', '2', '3','10' yazarak). '1' numara en önemli gördüğünüz özellik, '2' numara ikinci en önemli özellik, '3' numara üçüncü en önemli özellik, vs. olacaktır.

2. Birinci bölümde yaptığınız önem sıralamasını göz önünde tutarak, şu anda mevcut üretim donanımınıza en uygun olan ürünlerin rekabetçi üstünlük kazanmalarında ve başarılı olmalarında hangi özelliklerinin ne kadar önemli olduğunu belirtmenizi istiyoruz. Lütfen görüşünüzü aşağıdaki birden yediye kadar verilen çizelgeyi kullanarak belirtiniz. Örneğin, verilen özellik sizin ürünlerinizin rekabetçi üstünlük kazanmalarında ve başarılı olmalarında çok çok önemli bir yer tutuyorsa (7) numarayı, önemsiz ise (1) numarayı işaretleyiniz.

Üretim Birimi Anketi: Bölüm 2

	Önemsiz	Çok Az Önemli	Az Önemli	Kısmen Önemli	Önemli	Çok Önemli	Çok Çok Önemli	
	1	2	3	4	5	6	7	
Önem sırası							Önemsiz	Çok Çok Önemli
							(1)	(2)
							(3)	(4)
							(5)	(6)
							(7)	
—	Rekabetçi üstünlük kazanma ve başarılı olma özelliği						—	—
—	Müşteri isteklerine (spesifikasyonlarına) göre üretim						—	—
—	Ürün çeşitlerinin çokluğu						—	—
—	Yeni ürünlerin sunulması						—	—
—	Hızlı üretim						—	—
—	Ürünün güvenilir ve dayanıklı olması						—	—
—	Zamanında teslim						—	—
—	Düşük fiyat						—	—
—	Satış sonrası hizmetler						—	—
—	Ürünün çağdaş teknolojiye sahip olması						—	—
—	Değişik miktarlardaki talepleri karşılayabilme						—	—

Pazarlama Birimi Anketi: Bölüm 1

Sayın Katılımcı,

Bu anket, sizin şu anda mevcut ürünlerinizin rekabetçi üstünlük kazanma ve başarılı olma özelliklerini nasıl gördüğünüzü belirlemeye yöneliktir. Sırasıyla iki işlem yapmanızı rica ediyoruz:

1. Lütfen aşağıda verilen özellikleri şu anda mevcut ürünlerinizin rekabetçi üstünlük kazanmasındaki ve başarılı olmasındaki önemlerine göre sıraya dizin(yanlarına '1', '2', '3','10' yazarak). '1' numara en önemli gördüğünüz özellik, '2' numara ikinci en önemli özellik, '3' numara üçüncü en önemli özellik, vs. olacaktır.

2. Birinci bölümde yaptığınız önem sıralamasını göz önünde tutarak, şu anda mevcut ürünlerinizin rekabetçi üstünlük kazanmalarında ve başarılı olmalarında hangi özelliklerinin ne kadar önemli olduğunu belirtmenizi istiyoruz. Lütfen görüşünüzü aşağıdaki birden yediye kadar verilen çizelgeyi kullanarak belirtiniz. Örneğin, verilen özellik sizin ürünlerinizin rekabetçi üstünlük kazanmalarında ve başarılı olmalarında çok çok önemli bir yer tutuyorsa (7) numarayı, önemsiz ise (1) numarayı işaretleyiniz.

Pazarlama Birimi Anketi: Bölüm 1

	Önemsiz	Çok Az Önemli	Az Önemli	Kısmen Önemli	Önemli	Çok Önemli	Çok Çok Önemli				
	1	2	3	4	5	6	7				
Önem sırası	Rekabetçi üstünlük kazanma ve başarılı olma özelliği						Çok Çok Önemli				
	Önemsiz						Çok Çok Önemli				
					(1)	(2)	(3)	(4)	(5)	(6)	(7)
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—
——					—	—	—	—	—	—	—

Pazarlama Birimi Anketi: Bölüm 2

Sayın Katılımcı,

Bu anket, sizin pazar koşullarına en uygun olan ürünlerin rekabetçi üstünlük kazanma ve başarılı olma özelliklerini nasıl gördüğünüzü belirlemeye yöneliktir. Sırasıyla iki işlem yapmanızı rica ediyoruz:

1. Lütfen aşağıda verilen özellikleri pazar koşullarına en uygun olan ürünlerin rekabetçi üstünlük kazanmasındaki ve başarılı olmasındaki önemlerine göre sıraya dizin(yanlarına '1', '2', '3','10' yazarak). '1' numara en önemli gördüğünüz özellik, '2' numara ikinci en önemli özellik, '3' numara üçüncü en önemli özellik, vs. olacaktır.

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Pazarlama Birimi Anketi: Bölüm 2

Önem sırası		Önemsiz	Çok Az Önemli	Az Önemli	Kısmen Önemli	Önemli	Çok Önemli	Çok Çok Önemli				
		1	2	3	4	5	6	7				
	Rekabetçi üstünlük kazanma ve başarılı olma özelliği											
					Önemsiz			Çok Çok Önemli				
						(1)	(2)	(3)	(4)	(5)	(6)	(7)
—	Müşteri isteklerine (spesifikasyonlarına) göre üretim	—	—	—	—	—	—	—	—	—	—	—
—	Ürün çeşitlerinin çokluğu	—	—	—	—	—	—	—	—	—	—	—
—	Yeni ürünlerin sunulması	—	—	—	—	—	—	—	—	—	—	—
—	Hızlı üretim	—	—	—	—	—	—	—	—	—	—	—
—	Ürünün güvenilir ve dayanıklı olması	—	—	—	—	—	—	—	—	—	—	—
—	Zamanında teslim	—	—	—	—	—	—	—	—	—	—	—
—	Düşük fiyat	—	—	—	—	—	—	—	—	—	—	—
—	Satış sonrası hizmetler	—	—	—	—	—	—	—	—	—	—	—
—	Ürünün çağdaş teknolojiye sahip olması	—	—	—	—	—	—	—	—	—	—	—
—	Değişik miktarlardaki talepleri karşılayabilme	—	—	—	—	—	—	—	—	—	—	—

APPENDIX

B

CHECKLIST OF SUBJECTS

KONU KONTROL LİSTESİ

Kolay, genel ve tecrübeye dayalı sorularla başlayınız:

I. 'Şirketinizin kuruluşu ve gelişmesi hakkında biraz bilgi verirmisiniz?'

Daha özel sorularla devam ediniz:

II. 'Pazarlama-üretim Uyuşumu/ Koordinasyonu sizce ne ifade etmektedir, önemi nedir, şirketinizdeki durumu kısaca özetleyebildirmisiniz?'

III. 'Şirketinizde yaşanan problemlerden hangilerini bu uyuma bağlıyorsunuz?'

(‘Ör. Gerçekleşmeyen satış tahminleri, kapasite planlaması vb.’)

IV. 'Firmanızdaki bu problemler üzerinde etkisi olan faktörler nelerdir?'

(Ör. İletişim eksikliği, ödüllendirme sistemi vb.)

V. 'Pazarlama ve üretim fonksiyonlarınızın ayrı şirketlerce yürütülmesinin ne gibi avantaj ve dezavantajları vardır?'

VI. 'Pazarlama ve üretim şirketlerinin birleştirilmesiyle ilgili ne düşünüyorsunuz?'

PROBLEM ALANLARI:

Kapasite Planlaması ve Uzun Vadeli Satış Tahminleri:

'Potensiyel problem kaynağı olarak görülen alanlardan biri, satış tahminleri ile kapasite planları arasındaki uyumsuzluktur. Şirketinizde bu konu önemli bir sorun oluşturuyormu, sizce nedenleri nelerdir.? Bu uyumu sağlamak için ne gibi önlemler aldınız, hangileri başarılı oldu ve daha ne gibi önlemler alınabilir?'

Yeni Ürün Sunulması:

- ‘Şirketinizde yeni ürün geliştirilmesinden sorumlu birisi veya bir organ varmı?’
- ‘ Yeni ürün nasıl ve kimler tarafından tartışılıyor?’
- ‘Üretim ve pazarlama bölümleri tartışmaya hangi aşamada katılıyorlar’
- ‘Şirketiniz pazardaki değişimleri nasıl takip ediyor, (periyodik) olarak pazar araştırması yapıyor mu?’
- ‘ Bu bilgiler memorandum, toplantı veya başka yollarla üretim bölümüne iletiliyor mu?’
- ‘ Teknolojik gelişmeleri takip eden bir grubunuz var mı (Arge, üretim, vb)? Önemli konular pazarlama bölümüne iletiliyor mu?’

Kalite Güvencesi:

- ‘ Şirketiniz için kalite ne anlam ifade etmektedir?’
(Ör. Ürün (özellikleri), müşteri memnuniyeti, vb’)
- ‘ En çok önem verdiğiniz kalite unsuru nedir ve bunun için neler yapıyorsunuz?’
(Ör. Dayanıklılık, estetik-tasarım, müşteri için önemli özellikler, hata sayısı vb’)
- ‘ Firmanızda kalite konusunda oluşturulmuş organlar var mı(quality circles), amaçları nelerdir, kimler katılıyor?’
- ‘Şirketinizde görebildiğiniz kalite problemleri var mı?’

Maliyet Kontrolü

- ‘Eğer maliyetleri düşürmeniz gerekirse, buna nereden başlardınız’

Endüstride İstikrar:

‘İçinde bulunduğunuz endüstri ‘istikrarlı’ olarak nitelendirilebilir mi?’

(Ör. Değişken talep ve/veya teknoloji)

‘Bu endüstri’deki değişiklikler, üretim sisteminizi ne ölçüde etkiler?’

‘Üretimde ‘flexible manufacturing’ sistemi uygulanabiliyor mu?’

(Ör. Ürün, miktar değişiklikleri, vb.)

Şirket Stratejisi:

Firmanız ‘istikrarlı’ pazarlara mı hizmet ediyor, yeni pazar ve ürünler için çalışmalar var mı, yoksa pazarlar mı tercih ediliyor?’

Organizasyon Yapısı:

‘ Standart şirket politikaları, formlar, toplantılar, raporlar firmanızda kullanılıyor mu, evet ise hangi amaçla?’

‘Karar verme mekanizması şirket içinde nasıl işliyor? Yeni ürün veya pazar geliştirilmesi, varolan ürünlerin kaldırılması veya değişikliğe uğratılması gibi konularda, hangi bölümler hangi seviyelerde tartışmalara katılabiliyor?’

Değerlendirme ve Ödüllendirme Sistemi:

‘Çalışanlar hangi kriterlere göre değerlendiriliyor veya ödüllendiriliyor?’

Ör. Pazar payı, maliyet, yeni pazarlar, doğru satış tahmini, satış kotası, kar, kesintisiz üretim, stok seviyesi’

Organizasyondaki İlişkiler:

‘Şirketiniz çalışanlar arasındaki ilişkilerin gelişmesine ne tür katkılarda bulunuyor?’

(Ör. İş dışı organizasyonlar, öğle yemekleri, spor aktiviteleri, komiteler, task-forces, dönüşümlü olarak çalışma’)

‘Pazarlama/Üretim departmanındaki meslektaşlarınızla son bir ay içerisinde kaç kez görüşme fırsatınız oldu?’

Konuşmacıya görüşmenin sonuna yaklaşıldığını bildiriniz:

‘Size sormak istediğim bir kaç soru kaldı.’

APPENDIX

C

INTERVIEW SCRIPTS

Tarih : 6 NİSAN 1997

Yer : Gemlik Borusan Birleşik Boru Fabrikaları

BBBF Üretim Şefi ile yapılan mülakat

Sayın Üretim şefi ile görüşme saat 10.30'da başladı. Kendisine önce, pazarlama- üretim birimlerinin karşılıklı uyumunu inceleyen bu araştırmada, söz konusu tezin amaçlarından birinin bu uyum üzerinde önemli etkisi olan faktörleri qualitative yöntemler ile belirlemek olduğu belirtildi. İsimlerin kullanılmayacağı konusunda söz verildi.

S-Şirketinizin gelişmesi ve değişimi hakkında biraz bilgi verir misiniz.?

C-Borusan Türkiye'de Çelik Boru sektöründe gerçekten kendisini ispat etmiş büyük bir kuruluş. Holdingin kalbi olarak Boru Fabrikaları yaklaşık 36 yıldır Türkiye pazarında ilerliyor ve çelik boruda fazla rakip tanımıyor. Kurulduğumuz ilk günden bu yana ciromuzla doğru orantılı bir şekilde sürekli yatırımlar yapılıyor. Mesela, Borçelik Türkiye'de özsermaye ile yapılmış en büyük sanayi yatırımdır. 1994 yılındaki ekonomik krize rağmen, üretimimizin %48'ini ihraç etmiştik ve aynı yıl Borusan Boru senetlerinin %20'si İstanbul Bvorsasında satılmıştı. Yine 1994 yılında İstanbul- Kartal'da rakip bir firmanın fabrikası alınmış bunu 1995 yılında Trabzon'da diğer bir rakip firma fabrikasının alınması izlemiştir.%100 müşteri memnuniyeti ilkesiyle daha uzun seneler varolacağımıza inanıyorum.

S- Pazarlama-Üretim Uyuşumu/Koordinasyonu sizce ne ifade etmektedir, önemi nedir, şirketinizdeki durumu kısaca özetleyebilmisiniz?

C-Benim kanıma göre pazarlamanın en önemli görevi pazarların doğru tahminlerle belirlenip kapasitemizi en etkin kullanmamıza olanak verecek bir planlamada destek olmasıdır. Ancak istikrarsız ortamlarda doğru tahminler yapmak gerçekten çok zor oluyor.

S- Şirketinizde pazarlama-üretim uyumu nasıl? Yaşanan problemlerden hangilerini bu uyuma bağlıyorsunuz.?

C- Öncelile satış tahminlerinde problemler yaşanıyor. Şu anda mevcut satış grubu yeni işe alınmış elemanlardan oluşuyor bu elemanlar ne ürettiğimiz mamuller nede bu pazar hakkında detaylı bilgi ve tecrübeye sahip kişiler değil. Belki çok kaba olacak fakat bu iş büyük pazarlama firmalarında deterjan veya gıda maddesi satmaya benzemiyor. Sektör katma değeri çok düşük olan bir sektör olduğu için insanların yoğun çabası gerekiyor. Fabrikalarda yeterli üretim esnekliğimiz olmasına rağmen, mevcut müşteri ve ürünlere şartlanmış durumdayız. Değişik ebatlarda boru talebi geldiğinde, üretilebilir olduğu halde, bölümler arası kopukluklardan dolayı talep geri çevrilebiliyor. Belli zamanlarda fabrikada düzenlediğimiz toplantılardada pazarlama bölümünün İstanbul'da olmasından ötürü tam bir fikir alışverişi maalesef olmuyor. Telefondada üretim ile ilgili ne kadar görüşülebilsede tam bir verim alınmıyor.Bazen mevcut kapasite ve esnekliğimizle pazarlama tarafından değerlendirilmeyen pazarlara ulaşip biz bu parçayı veya boruyu çok daha düşük maliyetle üretebiliriz diyebilmeyi hayal ediyorum: Fakat bu durumun pazarlama tarafından görülüp değerlendirilmesi lazım. Aksi takdirde görev ve sorumluluklar birbirine girer. Herhangi bir müşteri

şikayeti olduğunda pazarlama şikayetin sebebi üretimden ve dolayısıyla fabrikadan kaynaklanıyor diyerek mevcut müşteriye kaçırmamak için anlaşıkları fiyatı kırıyor halbuki biz çoğu zaman müşteri ne istiyor, hangi özelliklerin üzerinde duruyor, gibi konularda yeterli bilgiyi alamıyoruz.

S- Bu uyumu sağlamak için ne gibi önlemler aldınız, hangileri başarılı oldu ve daha ne gibi önlemler alınabilir.?

C- Son dönemde Gemlik'de, birbirimizden neler beklediğimizi saptamak ve olası problem ve aksaklıkları gidermek için büyük bir toplantı yapıldı. Toplantıya üretim tarafından bizler, satış ve pazarlama olarakda İstanbul'dan Genel Müdürlükteki arkadaşlarımız katıldı. Elimizden geldiğince hangi konularda ve nasıl bir iletişim ağı kurmamız ve uygulamamız gerektiği tartışıldı. Uygulama aşamasında başarılı olabilmemiz için mamül bilgisine sahip arkadaşlarımızın pazarlamada görevler almasının özellikle müşteri isteklerinin belirlenmesinde faydalı olacağı kanısına varıldı. Fakat bu yönde henüz gerçekleşen bir uygulama yok. Örnek olarak bazı müşterilerimiz siparişlerinde çift soğuk damga bulunmasını istiyorlar. Pazarlama bölümü bizimle temasa geçip danışmak yerine talebi geri çevirebiliyor. Halbuki toplantı yapıp tartışılrsa görülecekki çok küçük bir yatırımla müşterinin bu isteği yerine getirilebilir ve böylece müşteri portföyümüz gelişebilir.

S-Şirketinizde yeni ürün geliştirilmesinden sorumlu bir organ var mı? Üretim ve pazarlama bölümleri tartışmaya hangi aşamalarda katılıyorlar.?

C- .AR-GE bölümümüz, pazarlamadan dolayısıyla müşterilerden gelen istekleri ve

değişiklikleri öncelikle bize soruyor. Eğer üretilebilirliği konusunda olumlu bakılmışsa bir örnek üretim yapılıyor ve gerekli testlerden geçiriliyor.. Bazı durumlardada AR-GE , elimizdeki mevcut kapasite ile farklı ne üretebiliriz diye düşünüp bazı yeni ürünler ortaya koyuyor.Son dönemde bu şekilde polietilen kaplı borular üretildi ve güzel neticeler alındı.

S- Şirketiniz pazardaki değişimleri nasıl takip ediyor, periyodik olarak pazar araştırması yapıyor mu?

C- Açık konuşmak gerekirse pazardaki değişimleri takip eden bir birim yok. Aynı pazarlara üretim yapıp yeni müşteri arayışından nedense kaçılıyor. Önümüzdeki günlerde bu müşteriler kaybedilirse ne olur diye düşünülüyor. ARGE tarafından yeni ürünler bulunabiliyor ancak bunun pazarlama tarafından müşterilerimize ve markete duyurulması sahiplenilmesi lazım.

S- Şirketiniz için kalite ne anlam ifade etmektedir.?

C-İç piyasada, Borusan kalitesi ile tanınarak piyasa ortalama fiyatlarının %5 fazlası ile müşteri buluyor. Dış piyasada ise kalitesini, yerli ve yabancı rakiplerine göre daha uygun fiyatlarla destekleyerek avrupa ve Amerika pazarında yayılıyor.Bizim mamüllerimiz piyasada, korozyona dayanıklılık, kaynak ve kullanılan malzeme kalitesi, toleranslara uygunluk, çapaksız üretim yönünden kendisini ve kalitesini devamlı geliştirerek pazar payını arttırmaya çalışıyor.

S-Şirketinizde görebildiğiniz kalite problemleri varmı?

Üretim olarak ele alırsak bizim gibi sürekli üretim yapan fabrikalarda teknik kalite problemleri kaçınılmazdır. Şirkette üretim ve kalite kontrol diye iki ayrı departman var. Bu organizasyon yapısından ve işçilerimizin tam olarak kalite fikrini alamamasından dolayı, nasıl olsa kalite kontrol var, hata varsa onlar bulur diyerek fazla dikkatli davranılmıyor.Haliyle toplam kalite fikrine şu aşamada girmek çok zor görünüyor. İşçiler hatalı üretimden ve kendi üretimlerinden sorumlu tutulmuyor. Şahsi fikrimi alacak olursanız toplam kalite yönetimine geçmek için şu anda mevcut işçilerimizin emekli olup yerine daha dinamik ve eğitimli bir neslin gelmesi lazım.

S- İçinde bulunduğunuz endüstri istikrarlı olarak nitelendirilebilirmi?

C- İç piyasa için eğer ekonomik olarak fazla dalgalanmalar yoksa istikrarlı demek doğru olur. Pazarda mevsimsel değişimler gözlenir.İnşaat sezonunun faaliyete geçtiği yaz ve ilkbahar aylarında talep ve dolayısıyla satışlarımız artıyor. Yurt dışında ise istikrarlı bir pazardan söz etmek daha zor. Çünkü anlık değişiklikler olup müşteri tercihleri değişebiliyor.Örneğin geçen sene Avrupa genelinde bulunan rakip fabrikalar birleşerek bölgelerinde talep olan boru ebatlarına göre üretim yapmaya başladılar. Bu durum bizim pazarımızı ciddi ölçüde daralttı.

S- Standart formlar, toplantılar raporlar firmanızda kullanılıyormu evet ise hangi amaçlarla?

C-ISO 9001 belgesi almış bir şirket olarak, bu prosedürün gereği olan standart raporlama ve iç yazışmalar oluyor. Bunun dışında anlık bir sorunla karşılaşıldığında

gerekli birimlerin katılımıyla toplantılar yapılır ve çözüm bulunmaya çalışılır. Bazı önemli aksaklıklarda örneğin sevkiyatı ciddi ölçüde geciktirecek ve tazminat ödememize sebep olacak durumlarda pazarlamadanda anlık katılım bekliyoruz ancak farklı yerlerde olmamızdan dolayı gecikmeler oluyor.

S- Karar verme mekanizması şirket içinde nasıl işliyor? Yeni ürün veya pazar geliştirilmesi, varolan ürünlerin kaldırılması veya değişikliğe uğratılması gibi konularda, hangi bölümler hangi seviyelerde toplantıya katılıyor?

C- Genellikle,yeni bir ürün üretilmesine veya mevcut mamulün kaldırılmasına yönelik kararlar Genel Müdürlük ve pazarlamanın önderliğinde bize gelir. Üretimle ilgili ARGE deneme imalatı yapar eğer fire ve diğer konularda olumlu neticeler alınırsa üretime gireriz. Değilse raporlanarak pazarlamaya, genel müdürlüğe ve ilgili müşterimize iletilir.

S- Çalışanlar hangi kriterlere göre değerlendiriliyor veya ödüllendiriliyor?

C- Tüm şirkette yılda bir defa olmak üzere uygulanan ve çalışanların amirleri tarafından yapılan standart bir performans değerlendirme işlemi var. Önemli bazı kriterlere göre çalışanla biraraya gelinerek bu formlar dolduruluyor. Daha sonra İnsan Kaynakları bölümü tarafından değerlendirilen bu formlara göre eğer amir onayı varsa çalışana çeşitli şekillerde geri dönebiliyor.

S- Bu ödüller hakkında kısa bilgi verebilirmisiniz?

C- Bunlar terfiler veya çeşitli maddi ödüller olabiliyor.

S- Pazarlama ve Üretim Size göre eşit olarak ödüllendiriliyor mu?

C- Pazarlamada birtakım hedefler rakamsal olarak belirlenip bunlar üzerinden ödüllendirilme yapıldığını zannediyorum, fakat üretim için rakamsal hedefler çok anlamlı olmuyor ve daha çok subjektif değerlendirmeler yapılıyor.

S- Şirketiniz çalışanlar arasındaki ilişkilerin gelişmesine ne tür katkıda bulunuyor?

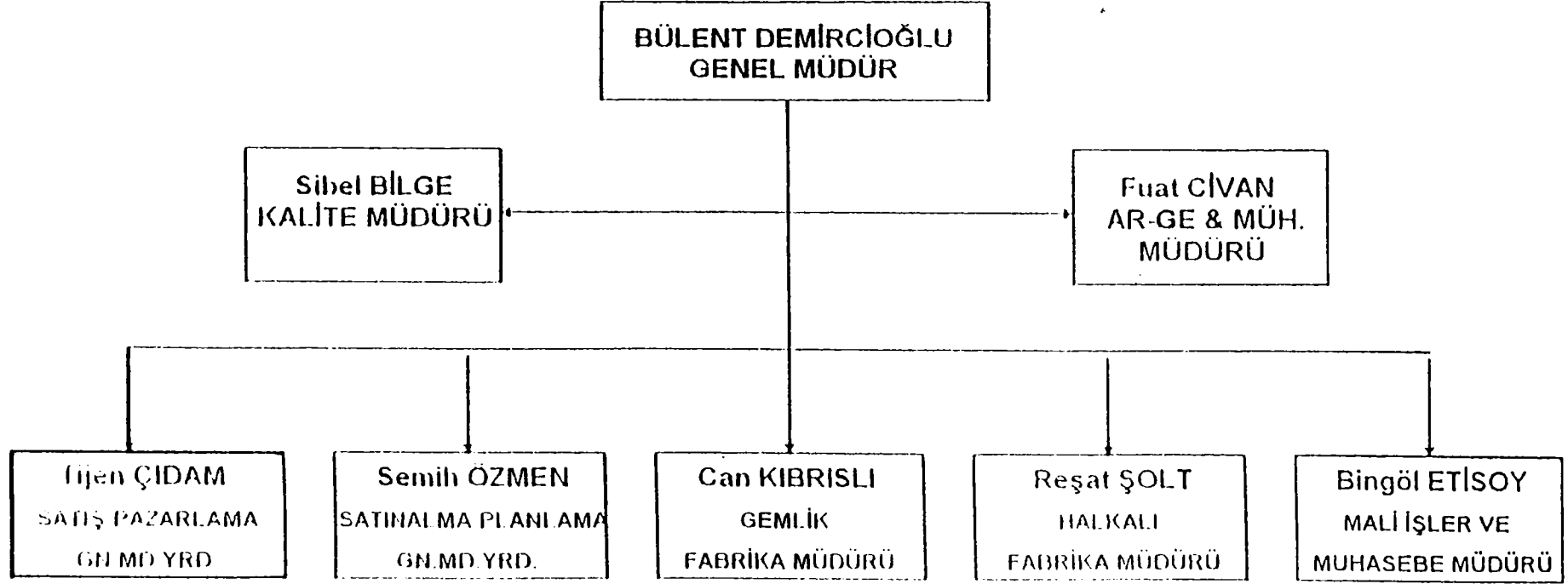
C- Son dönemde fabrikada pek çok sosyal tesis binası yapılarak faaliyete geçti. Bunlar, lokalimiz, spor salonu, yüzme havuzumuz ve oyun salonları. Yılın çeşitli zamanlarında fabrika ve genel müdürlük personeli biraraya geliyor ve yemek yiyoruz. Bunun yanında çeşitli eğitim kurumlarının düzenlediği ve insan ilişkilerini geliştirmeye yönelik seminerlere katılıyoruz. En son kurum kültürünü ve kurumdaşlığı geliştirmeye yönelik TMI(Time Management International) tarafından verilen bir seminere katıldık. Ayrıca genel müdürlükte bulunan arkadaşlarımız tarafından kurulmuş kulüplerimiz var, aynı hobileri paylaşan insanlar bir araya gelerek çeşitli aktivitelerde bulunuyorlar. Örneğin fotoğrafçılık kulübü, doğa ve dağcılık kulübü bunlardan birkaçı.

APPENDIX

D

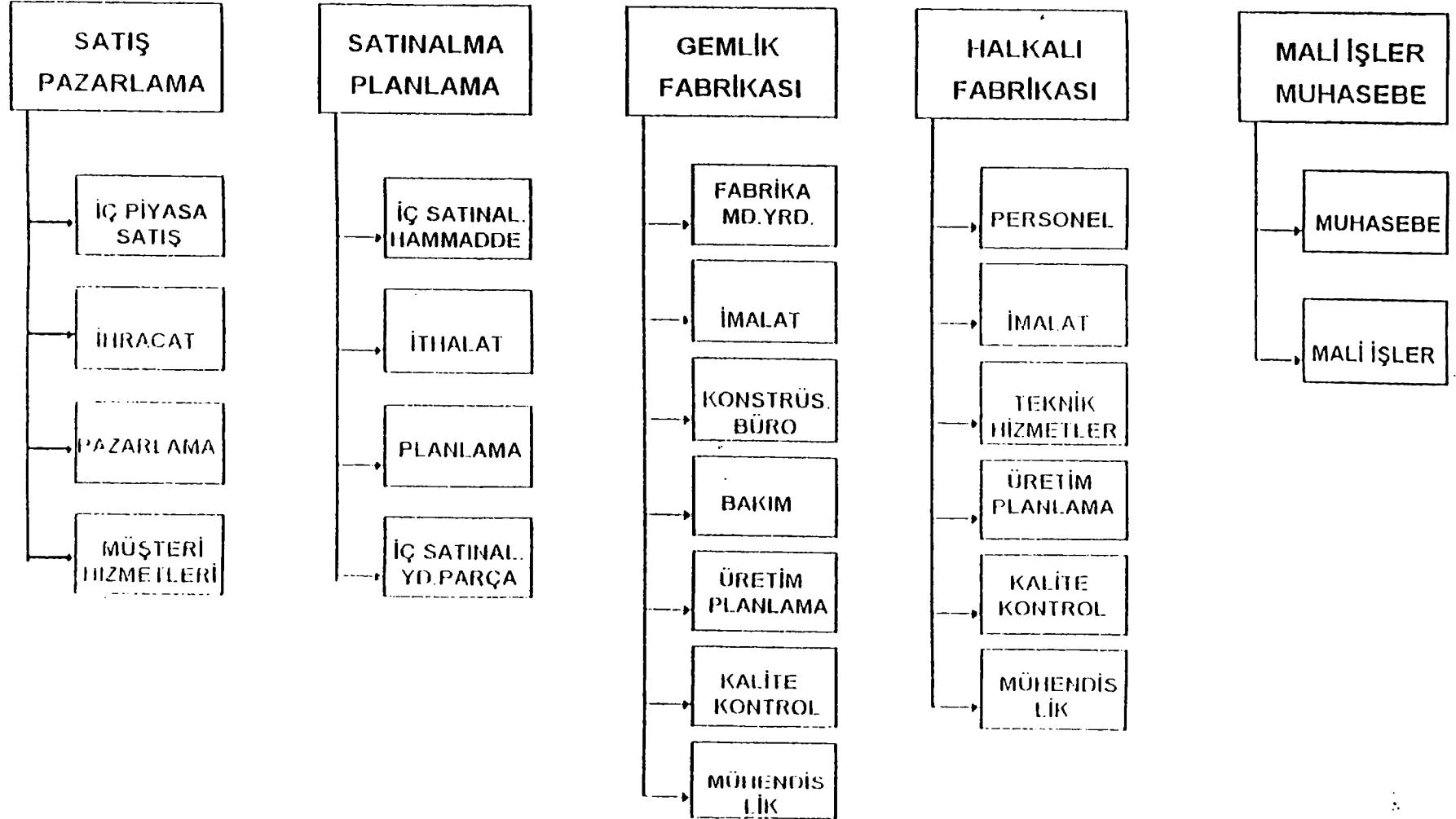
ORGANIZATION CHART OF THE COMPANY

BORUSAN BİRLEŞİK BORU FABRİKALARI A.Ş.
ORGANİZASYON ŞEMASI

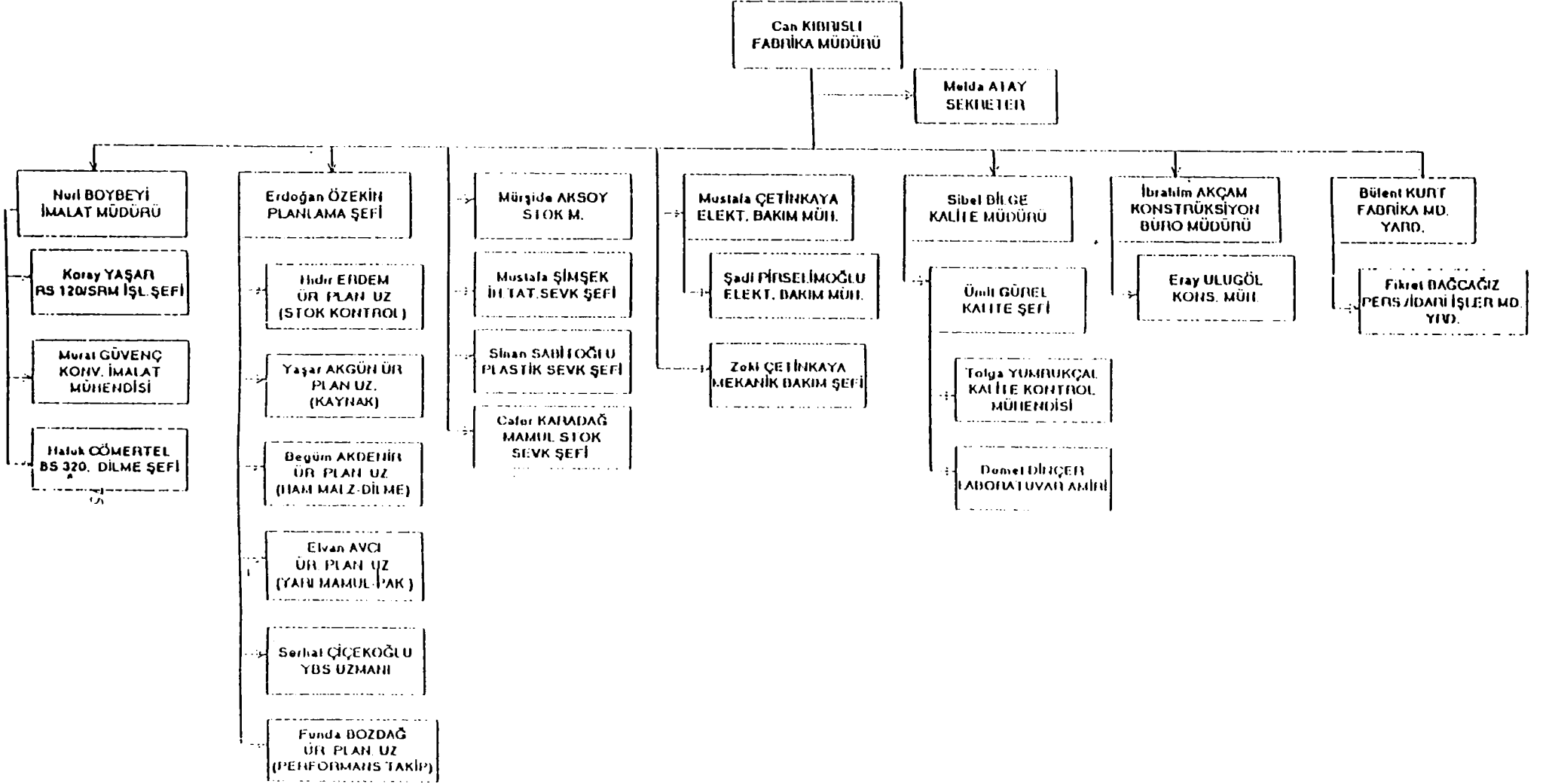


BORUSAN BİRLEŞİK BORU FABRİKALARI A.Ş.
DETAY ORGANİZASYON ŞEMASI

74



DBF GEMLİK FABRİKASI ORGANİZASYON ŞEMASI

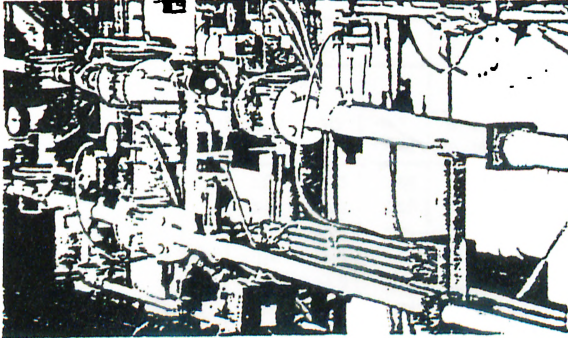


APPENDIX

E

PRODUCTS OF THE COMPANY

THE GEMLİK WORKS



MANUFACTURING METHODS

Six pipe mills and one stretch reducing mill.

END USES

Transmission of water, gas and oil.

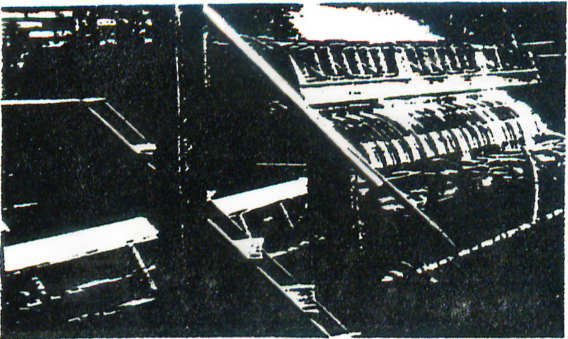
SIZES

Outside diameter:

- Pipe mills: OD 21.3 mm - 323.9 mm
(NB 1/2" - 12" 3/4).
- SRM: OD 21.3 mm - 88.9 mm
(NB 1/2" - 3").
- Wall thickness: 2.0 mm - 9.5 mm
(0.078" - 0.375").

Length:

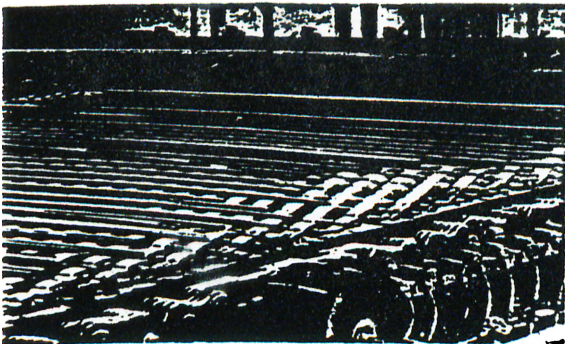
- Pipe mills: OD 21.3 mm - 101.6 mm ; max. 7.50 m
OD 114.3 mm - 323.9 mm ; max. 13.00 m.
- SRM: OD 21.3 mm - 88.9 mm ; max. 7.50 m.



PIPE ENDS

Plain (square-cut or bevelled).

Threaded and coupled.



SURFACE COATING

Black, self-colored.

Outside mill protective coating (oil, varnish).

Internal/external protection with bitumen.

Hot-dip galvanized (OD 21.3 mm - 168.3 mm, length max.: 7.50 m).

DIN 2440 & 2441

SIZE			DIN 2440				DIN 2441				
NOM (in)	OD (mm)	WT (mm)	WEIGHT				WT (mm)	WEIGHT			
			BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)		BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)
1/2	21.3	2.55	1.22	1.23	1.29	1.30	3.25	1.45	1.46	1.52	1.53
3/4	26.9	2.65	1.58	1.59	1.67	1.68	3.25	1.90	1.91	1.99	2.00
1	33.7	3.25	2.44	2.46	2.55	2.57	4.05	2.97	2.99	3.08	3.10
1 1/4	42.4	3.25	3.14	3.17	3.29	3.32	4.05	3.94	3.97	3.98	4.01
1 1/2	48.3	3.25	3.61	3.65	3.78	3.82	4.05	4.43	4.47	4.60	4.64
2	60.3	3.65	5.10	5.17	5.31	5.38	4.50	6.17	6.24	6.38	6.45
2 1/2	76.1	3.65	6.51	6.63	6.78	6.90	4.50	7.90	8.02	8.17	8.29
3	88.9	4.05	8.47	8.64	8.79	8.96	4.95	10.10	10.30	10.42	10.62
4	114.3	4.50	12.10	12.40	12.51	12.91	5.40	14.40	14.70	14.81	15.11
5	139.7	4.85	16.20	16.70	16.71	17.21	5.40	17.90	18.30	18.31	18.81
6	165.1	4.85	19.20	19.80	19.80	20.40	5.40	21.20	21.80	21.80	22.40

BPE: Black plain-end
GPE: Galvanized plain-end

BTC: Black threaded coupled
GTC: Galvanized threaded coupled

BS 1387

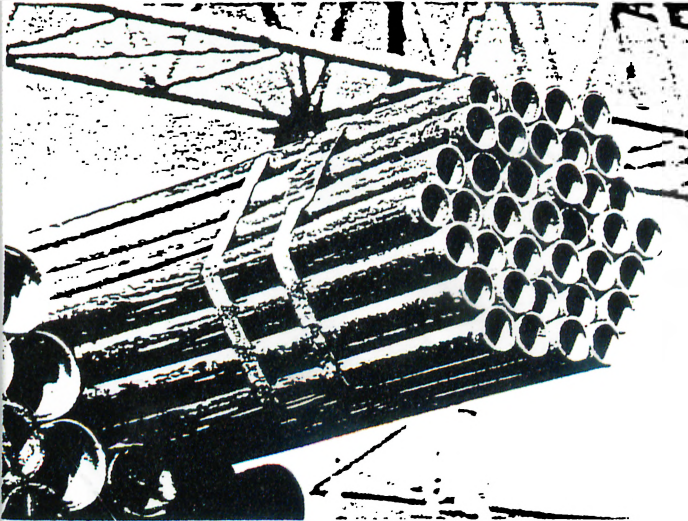
SIZE			MEDIUM				HEAVY				
NOM (in)	OD (mm)	WT (mm)	WEIGHT				WT (mm)	WEIGHT			
			BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)		BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)
1/2	21.3	2.5	1.21	1.22	1.28	1.29	3.2	1.44	1.45	1.51	1.52
3/4	26.9	2.6	1.56	1.57	1.65	1.66	3.2	1.97	1.98	1.96	1.97
1	33.7	3.2	2.41	2.43	2.53	2.55	4.0	2.94	2.96	3.05	3.07
1 1/4	42.4	3.2	3.10	3.13	3.25	3.28	4.0	3.80	3.83	3.94	3.97
1 1/2	48.3	3.2	3.57	3.61	3.74	3.78	4.0	4.38	4.42	4.55	4.59
2	60.3	3.6	5.03	5.10	5.24	5.31	4.5	6.19	6.26	6.40	6.47
2 1/2	76.1	3.6	6.43	6.55	6.70	6.82	4.5	7.93	8.05	8.20	8.32
3	88.9	4.0	8.37	8.54	8.69	8.86	5.0	10.30	10.50	10.62	10.82
4	114.3	4.5	12.20	12.50	12.61	12.91	5.4	14.50	14.80	14.91	15.21
5	139.7	5.0	16.60	17.10	17.11	17.61	5.4	17.90	18.40	18.41	18.91
6	165.1	5.0	19.70	20.30	20.30	20.90	5.4	21.30	21.90	21.90	22.50

See Table ISC 65 Light Series II for BS 1387 Light Series.

ASTM A 53

SIZE		SCH 10									
		WEIGHT				WEIGHT					
NOM (in.)	OD (in.) (mm)	WT		BPE / GPE		BTC / GTC		WT		BPE / GPE	
		(in.)	(mm)	(lb/ft)	(kg/m)	(lb/ft)	(kg/m)	(in.)	(mm)	(kg/m)	(kg/m)
1/2	0.840 21.3	0.109	2.77	0.95	1.27	0.95	1.27	-	-	-	-
3/4	1.050 26.7	0.113	2.87	1.13	1.69	1.13	1.69	0.083	2.11	0.86	1.28
	1.315 33.4	0.133	3.38	1.68	2.50	1.68	2.50	0.109	2.77	1.40	2.09
1 1/4	1.660 42.2	0.140	3.56	2.27	3.39	2.29	3.40	0.109	2.77	1.31	2.70
1 1/2	1.900 48.3	0.145	3.68	2.72	4.05	2.73	4.06	0.109	2.77	3.08	3.10
2	2.375 60.3	0.154	3.91	3.65	5.44	3.68	5.46	0.109	2.77	2.64	3.93
2 1/2	2.975 73.0	0.203	5.16	5.79	8.63	5.92	8.67	0.120	3.05	3.53	5.26
3	3.500 88.9	0.125	3.18	4.51	6.72	-	-	0.120	3.05	4.33	6.45
		0.156	3.96	5.57	8.29	-	-	-	-	-	-
		0.188	4.78	6.65	9.92	-	-	-	-	-	-
		0.216	5.49	7.58	11.29	7.62	11.35	-	-	-	-
3 1/2	4.000 101.6	0.125	3.18	5.17	7.72	-	-	0.120	3.05	4.97	7.41
		0.156	3.96	6.40	9.53	-	-	-	-	-	-
		0.188	4.78	7.65	11.41	-	-	-	-	-	-
		0.226	5.74	9.11	13.57	9.20	13.77	-	-	-	-
4	4.500 114.3	0.125	3.18	5.84	8.71	-	-	0.120	3.05	5.61	8.36
		0.156	3.96	7.24	10.78	-	-	-	-	-	-
		0.188	4.78	8.66	12.91	-	-	-	-	-	-
		0.219	5.56	10.01	14.91	-	-	-	-	-	-
		0.237	6.02	10.79	16.07	10.89	16.23	-	-	-	-
		0.250	6.35	11.35	16.90	-	-	-	-	-	-
5	5.563 141.3	0.156	3.96	9.01	13.41	-	-	0.134	3.40	7.77	11.58
		0.188	4.78	10.79	16.09	-	-	-	-	-	-
		0.219	5.56	12.50	18.61	-	-	-	-	-	-
		0.258	6.55	14.62	21.77	14.81	22.07	-	-	-	-
		0.281	7.14	15.85	23.62	-	-	-	-	-	-
6	6.625 168.3	0.188	4.78	12.92	19.27	-	-	-	-	-	-
		0.219	5.56	14.98	22.31	-	-	-	-	-	-
		0.250	6.35	17.02	25.36	-	-	-	-	-	-
		0.280	7.11	18.97	28.26	19.18	28.53	-	-	-	-
8	8.625 219.1	0.188	4.78	16.94	25.26	-	-	-	-	-	-
		0.203	5.16	18.26	27.22	-	-	-	-	-	-
		0.219	5.56	19.66	29.28	-	-	-	-	-	-
		0.250	6.35	22.36	33.31	-	-	-	-	-	-
		0.277	7.04	24.70	36.31	25.55	38.07	-	-	-	-
0.312	7.92	27.70	41.24	-	-	-	-	-	-		
10	10.750 273.0	0.188	4.78	21.21	31.62	-	-	-	-	-	-
		0.203	5.16	22.87	34.08	-	-	-	-	-	-
		0.219	5.56	24.63	36.67	-	-	-	-	-	-
		0.250	6.35	28.04	41.75	-	-	-	-	-	-
		0.279	7.09	31.20	46.49	32.75	48.30	-	-	-	-
0.307	7.80	34.24	51.01	35.75	53.27	-	-	-	-		
12	12.750 323.8	0.250	6.35	33.38	49.71	-	-	-	-	-	-
		0.281	7.14	37.42	55.75	-	-	-	-	-	-
		0.312	7.92	41.45	61.69	-	-	-	-	-	-

* SCH 40



PRODUCTION STANDARDS

DIN 2440, DIN 2441, DIN 2444,

BS 1387,

ISO 65,

ASTM A 53, ASTM A 135,

NFA 49145,

JIS G 3442, JIS G 3452,

GOST 10704,

UNI 8863, UNI 5745.

Other standards upon request.

PACKING

Bare bundles.

Special packing upon request.

INSPECTION

- Mill's certificate.
- Inspection by an independent organization authorized by the customer.

TESTS PERFORMED

Hydrostatic test.

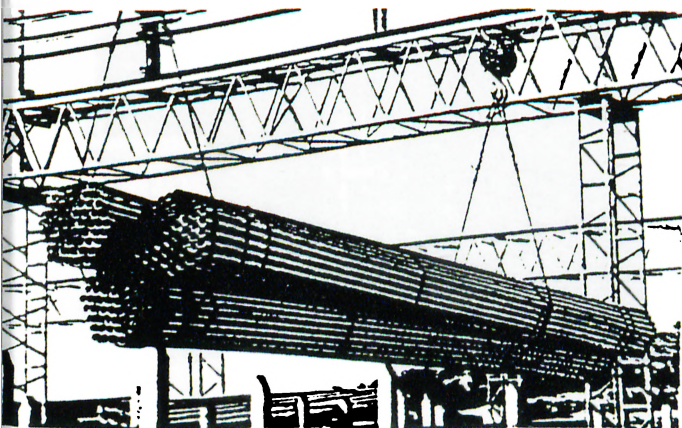
Destructive tests.

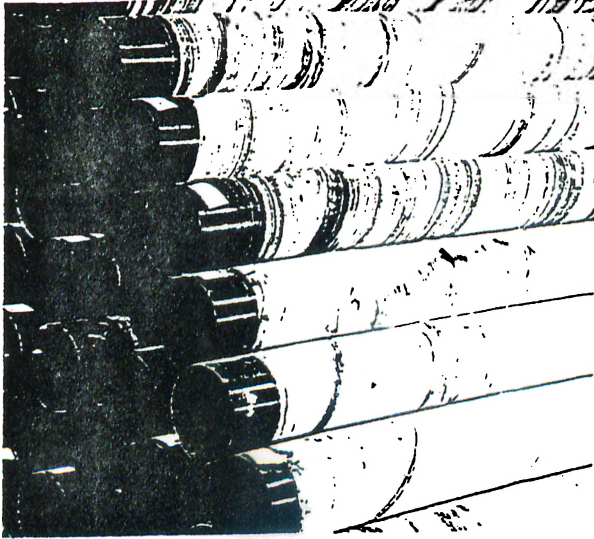
Nondestructive tests.

Others as required by the standards.

QUALITY CERTIFICATES

- TÜV Südwest AD - Merkblatt HP O/TRD 201 (DIN 2440-2441).
- DIN - DVGW Z1 223 (DIN 2440/2444) - DVGW Z3 223 (DIN 2441/2444).
- TÜV Rheinland AD-WO/TRD 100.





PRODUCTION STANDARDS

Line pipe - API 5L (from Gr A to X52), plain-end.

Casing - API 5CT, plain-end.

DIN 1626/2458, DIN 2470, DIN 17172,

GOST 20295/85.

PACKING

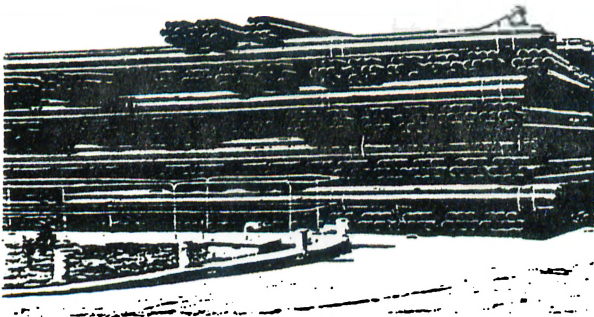
Standard applications.

Bare bundles.

Special packing upon request.

INSPECTION

- Mill's certificate.
- Inspection by an independent organization authorized by the customer.



TESTS PERFORMED

Mechanical tests.

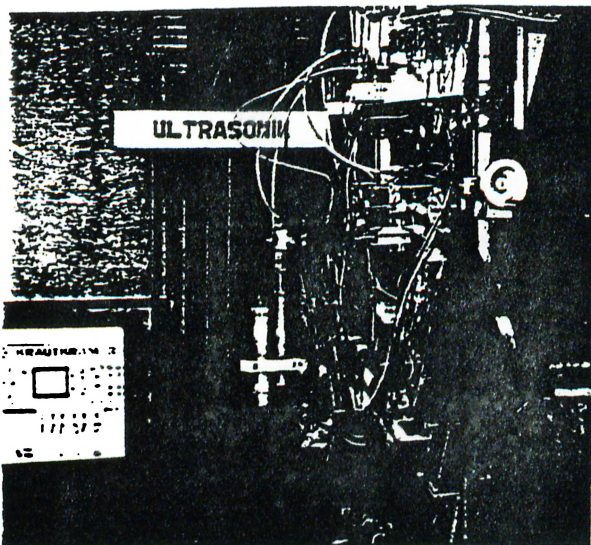
Chemical tests.

Hydrostatic tests.

Visual inspection.

Destructive tests.

Nondestructive tests.



QUALITY CERTIFICATES

- API 5L - 0114.
- API SPEC 5CT - 0146.
- TÜV Rheinland AD-WO/TRD 100 (DIN 1626 - 17172).
- TÜV SÜdwest AD-Merkblatt HP C/TRD 201 (DIN 1626).

ISO 65 / UNI 8863*

SIZE			MEDIUM SERIES				HEAVY SERIES				
NOM (in)	OD (mm)	WT (mm)	WEIGHT				WT (mm)	WEIGHT			
			BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)		BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)
1/2	21.3	2.6	1.21	1.22	1.28	1.29	3.2	1.44	1.45	1.51	1.52
3/4	26.9	2.6	1.56	1.57	1.65	1.66	3.2	1.87	1.88	1.96	1.97
1	33.7	3.2	2.41	2.43	2.53	2.55	4.0	2.93	2.95	3.05	3.07
1 1/4	42.4	3.2	3.10	3.13	3.25	3.28	4.0	3.79	3.82	3.94	3.97
1 1/2	48.3	3.2	3.56	3.60	3.73	3.77	4.0	4.37	4.41	4.54	4.58
2	60.3	3.6	5.03	5.10	5.24	5.31	4.5	6.19	6.26	6.40	6.47
2 1/2	76.1	3.6	6.42	6.54	6.70	6.82	4.5	7.93	8.05	8.20	8.32
3	88.9	4.0	8.06	8.53	8.69	8.56	5.0	10.30	10.50	10.62	10.82
4	114.3	4.5	12.20	12.50	12.61	12.91	5.4	14.50	14.80	14.91	15.21
5	139.7	5.0	16.60	17.10	17.11	17.61	5.4	17.90	18.40	18.41	18.91
6	165.1	5.0	19.80	20.40	20.40	21.00	5.4	21.30	21.90	21.90	22.50

*UNI 8863 Medium and Heavy Series (up to and including 4") are in accordance with ISO 65 Medium and Heavy Series.

ISO 65 / UNI 8863*

SIZE			LIGHT SERIES I				LIGHT SERIES II				
NOM (in)	OD (mm)	WT (mm)	WEIGHT				WT (mm)	WEIGHT			
			BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)		BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)
1/2	21.3	2.3	1.08	1.09	1.15	1.16	2.0	0.95	0.96	1.02	1.03
3/4	26.9	2.3	1.39	1.40	1.48	1.49	2.3	1.38	1.39	1.47	1.48
1	33.7	2.9	2.20	2.22	2.32	2.34	2.6	1.98	2.00	2.10	2.12
1 1/4	42.4	2.9	2.92	2.95	2.97	3.00	2.5	2.54	2.57	2.69	2.73
1 1/2	48.3	2.9	3.24	3.28	3.41	3.45	2.9	3.23	3.27	3.40	3.44
2	60.3	3.2	4.49	4.56	4.71	4.78	2.9	4.08	4.15	4.30	4.37
2 1/2	76.1	3.2	5.73	5.85	6.00	6.12	3.2	5.71	5.83	5.98	6.10
3	88.9	3.6	7.55	7.72	7.87	8.04	3.2	6.72	6.89	7.04	7.21
4	114.3	4.0	10.80	11.10	11.22	11.52	3.6	9.75	10.00	10.17	10.42

*UNI 8863 Light Series (up to and including 4") is in accordance with ISO 65 Light I Series.

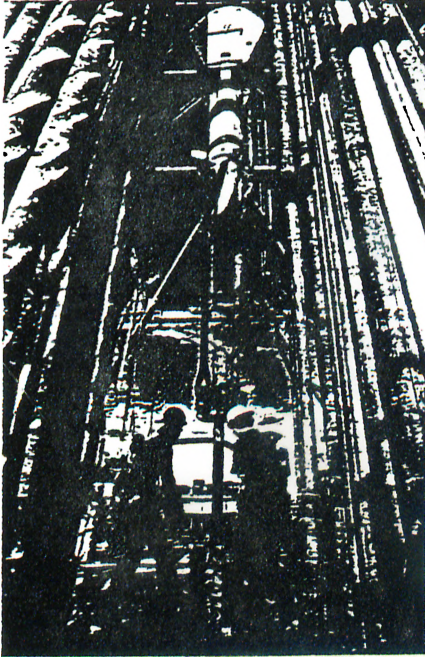
NFA A49 - 145*

SIZE			MEDIUM SERIES				HEAVY SERIES				
NOM (in)	OD (mm)	WT (mm)	WEIGHT				WT (mm)	WEIGHT			
			BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)		BPE (kg/m)	BTC (kg/m)	GPE (kg/m)	GTC (kg/m)
1/2	21.3	2.6	1.20	1.21	1.27	1.29	3.2	1.43	1.44	1.50	1.51
3/4	26.9	2.6	1.56	1.57	1.65	1.66	3.2	1.87	1.88	1.96	1.97
1	33.7	3.2	2.41	2.43	2.53	2.55	4.0	2.93	2.95	3.04	3.06
1 1/4	42.4	3.2	3.09	3.12	3.24	3.27	4.0	3.79	3.82	3.94	3.97
1 1/2	48.3	3.2	3.56	3.60	3.73	3.77	4.0	4.37	4.41	4.54	4.58
2	60.3	3.6	5.03	5.10	5.24	5.31	4.5	6.19	6.26	6.40	6.47
2 1/2	76.1	3.6	6.44	6.56	6.71	6.83	4.5	7.95	8.07	8.22	8.34
3	88.9	4.0	8.08	8.55	8.70	8.97	4.9	10.00	10.20	10.32	10.52
4	114.3	4.5	12.20	12.50	12.61	12.91	5.4	14.50	14.80	14.91	15.21

*See table ISO 65 Light Series I and II for NFA A49-145 Light Series: 21.3 - 60.3 incl. Light I
76.1 - 114.3 incl. Light II



SIZE					WEIGHT		Test Pressure, 100 k. Pa min.						
Nom (in)	Outside Diameter		Wall Thickness		PE			Grade					
	(in)	(mm)	(in)	(mm)	lb/ft	kg/m		A	B	A 25	X 42	X 46	X 52
3 1/2	3.500	88.9	0.109	2.8	3.95	5.95	STD	-	-	55	110	120	136
							ALT	-	-	-	137	150	170
3 1/2	3.500	88.9	0.125	3.2	4.51	6.76	STD	39	104	69	125	137	155
							ALT	-	-	-	157	171	194
3 1/2	3.500	88.9	0.141	3.6	5.06	7.57	STD	-	-	69	141	154	174
							ALT	-	-	-	176	193	207
3 1/2	3.500	88.9	0.156	4.0	5.57	8.37	STD	112	130	69	157	171	194
							ALT	-	-	-	196	207	207
3 1/2	3.500	88.9	0.172	4.4	6.11	9.17	STD	123	143	69	172	188	207
							ALT	-	-	-	207	207	207
3 1/2	3.500	88.9	0.188	4.8	6.65	9.95	STD	134	156	69	188	205	207
							ALT	-	-	-	207	207	207
4 1/2	4.500	114.3	0.125	3.2	5.84	8.77	STD	55	70	91	97	106	121
							ALT	-	-	-	122	133	151
4 1/2	4.500	114.3	0.141	3.6	6.56	9.83	STD	-	78	91	110	120	136
							ALT	-	-	-	137	150	170
4 1/2	4.500	114.3	0.156	4.0	7.24	10.88	STD	59	87	101	122	133	151
							ALT	-	-	-	152	166	188
4 1/2	4.500	114.3	0.172	4.4	7.95	11.92	STD	-	96	111	134	146	166
							ALT	-	-	-	167	183	207
4 1/2	4.500	114.3	0.188	4.8	9.66	12.96	STD	33	104	121	146	160	181
							ALT	-	-	-	183	200	207
4 1/2	4.500	114.3	0.203	5.2	9.32	13.99	STD	-	113	132	158	173	196
							ALT	-	-	-	198	207	207
4 1/2	4.500	114.3	0.219	5.6	10.01	15.01	STD	33	122	142	170	186	207
							ALT	-	-	-	207	207	207
4 1/2	4.500	114.3	0.237	6.0	10.79	16.02	STD	33	130	152	183	200	207
							ALT	-	-	-	207	207	207
4 1/2	4.500	114.3	0.250	6.4	11.35	17.03	STD	-	139	162	195	207	207
							ALT	-	-	-	207	207	207
5 9/16	5.563	141.3	0.156	4.0	9.01	13.54	STD	58	70	82	97	107	121
5 9/16	5.563	141.3	0.188	4.8	10.79	16.16	STD	70	84	98	117	129	145
5 9/16	5.563	141.3	0.219	5.6	12.50	18.74	STD	31	98	115	137	150	170
5 9/16	5.563	141.3	0.258	6.6	14.62	21.92	STD	33	116	135	161	177	199
5 9/16	5.563	141.3	0.281	7.1	15.85	23.50	STD	35	125	145	176	192	207

THE GEMLİK WORKS**MANUFACTURING METHODS**

- One pipe mill and one stretch reducing mill.

END USES

- Transmission of water, oil, and gas.
- Transmission of slurries and chemical liquids.
- Casing.

SIZES**Outside Diameter:**

- Pipe mills: OD 114.3 mm - 323.9 mm
(OD 4 1/2" - 12 3/4").
- SRM: OD 21.3 mm - 88.9 mm
(OD 1/2" - 3").
- Wall thickness: 2.0 mm - 9.5 mm

(0.078" - 0.375").

Length:

- Pipe mills: OD 114.3 mm - 323.9 mm ;
max. 13.00 m.
- SRM: OD 21.3 mm- 88.9 mm ; max. 7.50 m.

PIPE ENDS

Plain (square-cut or bevelled).

SURFACE COATING

Black, self-coiled.

Outside mill protective coating (oil, lacquer).

Internal/external protection with bitumen.



SUMMARY OF CHEMICAL AND PHYSICAL PROPERTIES

GRADE	Chemical Composition							Tensile Requirements		Elongation % Min. GL = 2 in. (50.80 mm)
								Yield Strength Min	Tensile Strength Min	
	C Max	Mn Max	P Max	S Max	Cb Max	V Min	Ti Min	PSI	PSI	
A 25 CLASS I	0.21	0.60	0.045		-	-	-	25,000	45,000	e = 625,000 $\frac{A \cdot U}{U \cdot P}$ e = minimum elongation in 2 in in percent to nearest 1/2 percent A = cross-sectional area of the tensile test specimen in in. ² U = specified minimum ultimate tensile strength in psi
A 25 CLASS II	0.21	0.60	0.08	0.06						
A	0.21	0.90	0.04	0.05	-	-	-	30,000	48,000	
B	0.26	1.15	0.04	0.05	-	-	-	35,000	60,000	
X 42	0.28	1.25	0.04	0.05	-	-	-	42,000	60,000	
X 46	0.30	1.35	0.04	0.05	-	-	-	46,000	63,000	
X 52	0.30	1.35	0.04	0.05	-	-	-	52,000	66,000	

API 5 CT

SIZE (OD)		NOM. WEIGHT PLAIN END		WALL THICKNESS		TYPE OF END FINISH	
in	mm	lb/ft	kg/m	in	mm	H=40	J=55
4 1/2	114.3	9.40	13.99	0.205	5.21	P	P
4 1/2	114.3	10.23	15.22	0.224	5.69	-	P
4 1/2	114.3	11.35	16.69	0.250	6.35	-	P
5	127.0	11.23	16.71	0.220	5.59	-	P
5	127.0	12.93	19.09	0.253	6.43	-	P
5 1/2	139.7	13.70	20.39	0.244	6.20	P	P
6 5/8	168.3	19.49	29.01	0.288	7.32	P	P
8 5/8	219.1	23.57	35.08	0.264	6.71	-	P
9 5/8	249.1	27.02	40.21	0.304	7.70	P	-
10 3/4	273.1	31.20	46.43	0.279	7.09	P	-

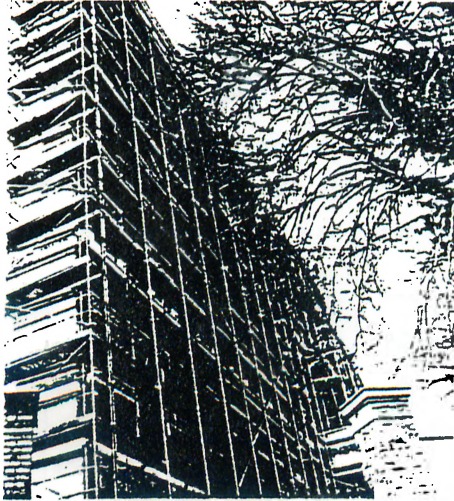
P: Plain end.

GOST 20295 / 85

OUTSIDE DIAMETER	Theoretical weights per unit in kg/m (wall thickness in mm)										
	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
59	11.54	13.42	15.29	17.15	18.99	20.82	22.64	24.44	26.24		
68	12.21	14.20	16.18	18.15	20.10	22.04	23.97	25.89	27.79		
76			17.15	19.12	21.07	23.00	24.92	26.83	28.73	30.62	
86			18.15	20.12	22.07	24.00	25.92	27.83	29.73	31.62	33.50
96			19.15	21.12	23.07	25.00	26.92	28.83	30.73	32.62	34.50
106			20.15	22.12	24.07	26.00	27.92	29.83	31.73	33.62	35.50
116			21.15	23.12	25.07	27.00	28.92	30.83	32.73	34.62	36.50
126			22.15	24.12	26.07	28.00	29.92	31.83	33.73	35.62	37.50
136			23.15	25.12	27.07	29.00	30.92	32.83	34.73	36.62	38.50
146			24.15	26.12	28.07	30.00	31.92	33.83	35.73	37.62	39.50
156			25.15	27.12	29.07	31.00	32.92	34.83	36.73	38.62	40.50
166			26.15	28.12	30.07	32.00	33.92	35.83	37.73	39.62	41.50
176			27.15	29.12	31.07	33.00	34.92	36.83	38.73	40.62	42.50
186			28.15	30.12	32.07	34.00	35.92	37.83	39.73	41.62	43.50
196			29.15	31.12	33.07	35.00	36.92	38.83	40.73	42.62	44.50
206			30.15	32.12	34.07	36.00	37.92	39.83	41.73	43.62	45.50
216			31.15	33.12	35.07	37.00	38.92	40.83	42.73	44.62	46.50
226			32.15	34.12	36.07	38.00	39.92	41.83	43.73	45.62	47.50
236			33.15	35.12	37.07	39.00	40.92	42.83	44.73	46.62	48.50
246			34.15	36.12	38.07	40.00	41.92	43.83	45.73	47.62	49.50
256			35.15	37.12	39.07	41.00	42.92	44.83	46.73	48.62	50.50
266			36.15	38.12	40.07	42.00	43.92	45.83	47.73	49.62	51.50
276			37.15	39.12	41.07	43.00	44.92	46.83	48.73	50.62	52.50
286			38.15	40.12	42.07	44.00	45.92	47.83	49.73	51.62	53.50
296			39.15	41.12	43.07	45.00	46.92	48.83	50.73	52.62	54.50
306			40.15	42.12	44.07	46.00	47.92	49.83	51.73	53.62	55.50
316			41.15	43.12	45.07	47.00	48.92	50.83	52.73	54.62	56.50
325			42.15	44.12	46.07	48.00	49.92	51.83	53.73	55.62	57.50



SIZE					WEIGHT		Test Pressure, 100 k. Pa min.						
Nom (in)	Outside Diameter		Wall Thickness		PE		STD ALT	Grade	Grade	Grade	Grade	Grade	Grade
	(in)	(mm)	(in)	(mm)	lb/ft	kg/m		A	B	X 25	X 42	X 46	X 52
1/2	0.840	21.3	0.109	2.8	0.85	1.28	STD ALT	48	48	48	-	-	-
3/4	1.050	26.7	0.113	2.9	1.13	1.70	STD ALT	48	48	48	-	-	-
1	1.315	33.4	0.133	3.4	1.68	2.52	STD ALT	48	48	48	-	-	-
1	1.215	33.4	0.179	4.5	2.17	3.21	STD ALT	59	59	59	-	-	-
1 1/4	1.660	42.2	0.140	3.6	2.27	3.43	STD ALT	83	90	69	-	-	-
1 1/4	1.660	42.2	0.191	4.9	3.00	4.51	STD ALT	124	131	90	-	-	-
1 1/2	1.900	48.3	0.145	3.7	2.72	4.07	STD ALT	83	90	69	-	-	-
1 1/2	1.900	48.3	0.200	5.1	3.63	5.43	STD ALT	124	131	90	-	-	-
2 3/8	2.375	60.3	0.109	2.8	2.64	3.97	STD ALT	-	-	55	162	177	200
2 3/8	2.375	60.3	0.125	3.2	3.00	4.51	STD ALT	-	-	69	185	202	207
2 3/8	2.375	60.3	0.141	3.6	3.36	5.03	STD ALT	-	-	69	207	207	207
2 3/8	2.375	60.3	0.154	3.9	3.65	5.42	STD ALT	161	172	69	207	207	207
2 3/8	2.375	60.3	0.172	4.4	4.05	6.07	STD ALT	172	172	76	207	207	207
2 3/8	2.375	60.3	0.288	4.8	4.39	6.57	STD ALT	172	172	83	207	207	207
2 7/8	2.875	73.0	0.109	2.8	3.22	4.85	STD ALT	-	-	55	133	146	165
2 7/8	2.875	73.0	0.125	3.2	3.67	5.51	STD ALT	-	-	69	167	182	207
2 7/8	2.875	73.0	0.141	3.6	4.12	6.16	STD ALT	-	-	69	153	167	189
2 7/8	2.875	73.0	0.156	4.0	4.53	6.81	STD ALT	-	-	69	191	207	207
2 7/8	2.875	73.0	0.172	4.4	4.97	7.44	STD ALT	150	172	69	207	207	207
2 7/8	2.875	73.0	0.188	4.8	5.40	8.07	STD ALT	163	172	69	207	207	207
2 7/8	2.875	73.0	0.203	5.2	5.79	8.69	STD ALT	172	172	69	207	207	207

THE GEMLİK WORKS**MANUFACTURING METHODS**

Six pipe mills and one stretch reducing mill.

END USES

Structural and civil engineering, construction, scaffolding systems, poles.

SIZES**Outside Diameter:**

- Pipe mills: OD 21.3 mm - 323.9 mm
(1/2" - 12 3/4").

- SRM: OD 21.3 mm - 88.9 mm
(1/2" - 3").

- Wall thickness: 2.0 mm - 9.5 mm
(0.079" - 0.375").

Length:

- Pipe mills: OD 21.3 mm - 101.6 mm: max. 7.50 m
OD 114.3 mm - 323.9 mm: max. 13.00 m.

- SRM: OD 21.3 mm - 88.9 mm: max. 7.30 m.

**PIPE ENDS**

Square-cut or bevelled.

SURFACE COATING

Black, self-colored.

Outside mill protective coating (varnished, oiled).

Hot-dip galvanized (OD 21.3 mm - 168.3 mm).

PRODUCTION STANDARDS

DIN 1615, DIN 2458, DIN 17120

BS 4848, BS 6363, BS 1139.

ASTM A 252.

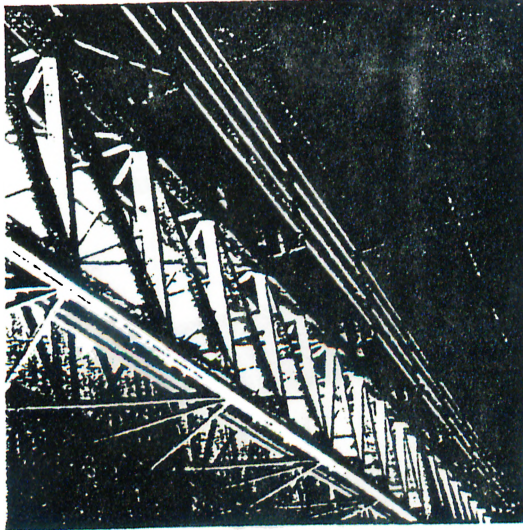
NFA 49643, NFA 49501.^{S7}

JIS G 3444

Other standards upon request.

API 5L

SIZE					WEIGHT		Test Pressure, 100 k. Pa min.						
Nom (in)	Outside Diameter (in) (mm)		Wall Thickness (in) (mm)		PE lb/ft kg/m			Grade A	Grade B	Grade A 25	Grade X 42	Grade X 46	Grade X 52
6 5/8	6.625	168.3	0.156	4.0	10.78	16.21	STD	59	68	-	102	112	127
							ALT	73	85	-	-	-	-
6 5/8	6.625	168.3	0.172	4.4	11.85	17.78	STD	64	75	-	113	123	140
							ALT	81	94	-	-	-	-
6 5/8	6.625	168.3	0.188	4.8	12.92	19.35	STD	70	82	-	123	135	152
							ALT	88	103	-	-	-	-
6 5/8	6.625	168.3	0.203	5.2	13.92	20.91	STD	76	89	-	133	145	165
							ALT	95	111	-	-	-	-
6 5/8	6.625	168.3	0.219	5.6	14.98	22.47	STD	82	96	-	143	157	173
							ALT	103	120	-	-	-	-
6 5/8	6.625	168.3	0.250	6.4	17.02	25.55	STD	94	109	-	164	179	203
							ALT	117	136	-	-	-	-
6 5/8	6.625	168.3	0.280	7.1	18.97	28.22	STD	105	123	-	183	201	207
							ALT	131	153	-	-	-	-
6 5/8	6.625	168.3	0.312	7.9	21.04	31.25	STD	117	136	-	205	207	207
							ALT	146	170	-	-	-	-
8 5/8	8.625	219.1	0.156	4.0	14.11	21.22	STD	45	52	-	79	86	97
							ALT	56	65	-	-	-	-
8 5/8	8.625	219.1	0.188	4.8	16.94	25.37	STD	54	63	-	94	103	117
							ALT	68	79	-	-	-	-
8 5/8	8.625	219.1	0.203	5.2	18.26	27.43	STD	-	-	-	102	112	127
							ALT	-	-	-	-	-	-
8 5/8	8.625	219.1	0.219	5.6	19.66	29.48	STD	63	74	-	110	121	136
							ALT	79	92	-	-	-	-
8 5/8	8.625	219.1	0.250	6.4	22.36	33.57	STD	72	84	-	126	138	156
							ALT	90	105	-	-	-	-
8 5/8	8.625	219.1	0.277	7.0	24.70	36.61	STD	80	93	-	139	153	173
							ALT	100	116	-	-	-	-
8 5/8	8.625	219.1	0.312	7.9	27.70	41.14	STD	90	105	-	157	172	194
							ALT	112	131	-	-	-	-
8 5/8	8.625	219.1	0.322	8.2	28.55	42.65	STD	92	108	-	162	178	200
							ALT	116	135	-	-	-	-
10 3/4	10.750	273.1	0.188	4.8	21.21	31.76	STD	43	50	-	86	94	107
							ALT	54	63	-	-	-	-
10 3/4	10.750	273.1	0.203	5.2	22.87	34.35	STD	-	-	-	93	102	115
							ALT	-	-	-	-	-	-
10 3/4	10.750	273.1	0.219	5.6	24.63	36.94	STD	50	59	-	100	110	124
							ALT	63	74	-	-	-	-
10 3/4	10.750	273.1	0.250	6.4	28.04	42.09	STD	58	68	-	114	125	142
							ALT	72	84	-	-	-	-
10 3/4	10.750	273.1	0.279	7.1	31.20	46.57	STD	64	75	-	127	140	158
							ALT	81	94	-	-	-	-
10 3/4	10.750	273.1	0.307	7.8	34.24	51.03	STD	71	83	-	141	154	174
							ALT	89	103	-	-	-	-
12 3/4	12.750	323.9	0.203	5.2	27.20	40.87	STD	-	-	-	79	86	97
							ALT	-	-	-	-	-	-
12 3/4	12.750	323.9	0.219	5.6	29.31	43.96	STD	43	50	-	85	92	105
							ALT	53	62	-	-	-	-
12 3/4	12.750	323.9	0.250	6.4	33.38	50.11	STD	49	56	-	96	105	119
							ALT	61	71	-	-	-	-
12 3/4	12.750	323.9	0.291	7.1	37.42	55.47	STD	54	64	-	108	119	134
							ALT	68	80	-	-	-	-
12 3/4	12.750	323.9	0.312	7.9	41.45	61.56	STD	61	71	-	121	132	149
							ALT	75	88	-	-	-	-

THE GEMLIK AND HALKALI WORKS**MANUFACTURING METHODS**

- Three pipe mills in Gemlik.
- Seven pipe mills in Halkali.

END USES

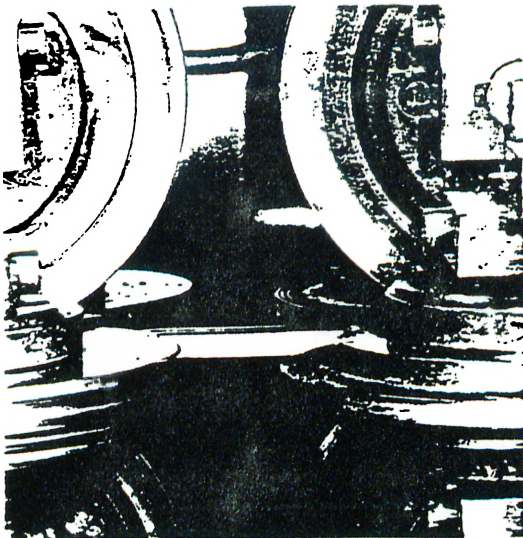
Civil engineering, construction, machinery, agricultural equipment, conveyors, cranes, furniture.

SIZES**Outside Diameter:**

- 10 x 10 mm - 150 x 150 mm in squares
(1/2" x 1/2" - 6" x 6")
- 15 x 10 mm - 200 x 100 mm in rectangulars
(1" x 1/2" - 8" x 4").
- Wall thickness: 0.8 mm - 9.5 mm
(0.030" - 0.375").

Length:

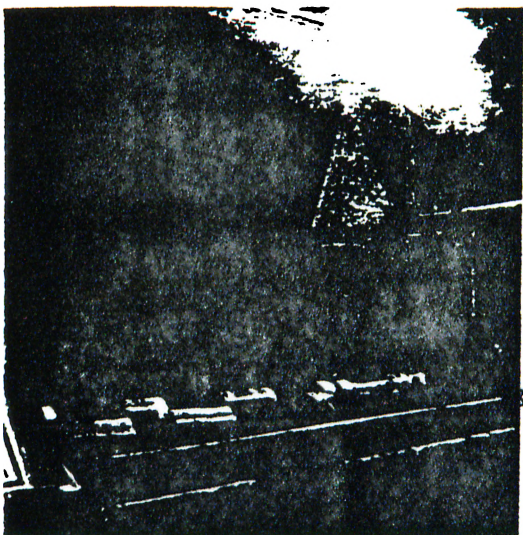
- Up to 8 m for sizes less than
100 x 100 mm / 4" x 4" and corresponding
rectangulars.
- Up to 13 m for sizes greater than or equal
to 100 x 100 mm / 4" x 4" and corresponding
rectangulars.

**PIPE ENDS**

Square-cut.

SURFACE CONDITION

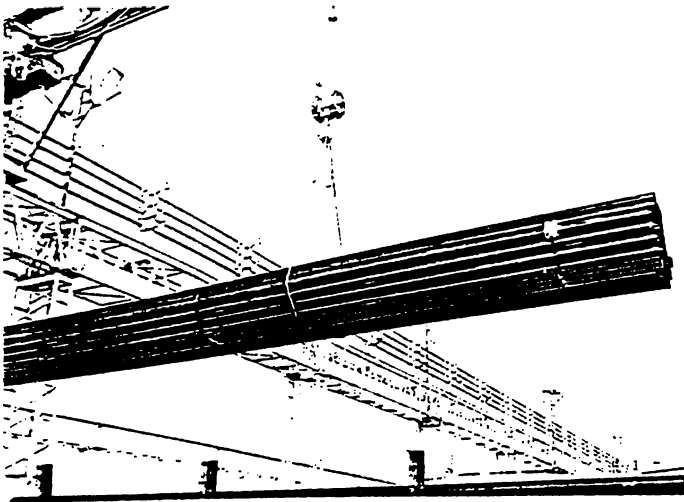
- Hot-rolled: black/unpickled.
- Hot-rolled: pickled & oiled.
- Cold-rolled.



PACKING

Bare bundles.

Special packing upon request.



INSPECTION

- Mill's certificate .
- Inspection by an independent organization authorized by the customer.

TESTS PERFORMED

As required by the standards.

QUALITY CERTIFICATES

TÜV Südwest AD-Merkblatt HP O/TRD 201
(DIN 1615).

CIRCULAR STRUCTURAL TUBES

NCM (in)	OD (mm)	Theoretical weights per unit in kg/m (wall thickness in mm)																
		2.00	2.50	3.00	3.2	3.5	4.00	4.50	5.00	6.00	7.00	8.00						
1/2	21.3	0.952	1.159	1.354														
3/4	26.9	1.230	1.504	1.755	1.970													
1	33.7	1.560	1.923	2.271	2.410	2.607	2.930											
	38	1.790	2.199	2.559	2.750	2.975	3.350											
1 1/4	42.4	1.990	2.460	2.915	3.090	3.357	3.790	4.210										
1 1/2	48.3	2.290	2.824	3.351	3.560	3.867	4.370	4.860										
	51	2.420	2.990	3.551	3.770	4.100	4.640	5.160										
	57	2.710	3.360	3.995	4.250	4.613	5.200	5.800										
2	60.3	2.980	3.663	4.339	4.510	4.900	5.550	6.190										
	73	3.500	4.346	5.179	5.310	5.809	6.510	7.200	8.000									
2 1/2	76.1	3.650	4.537	5.409	5.750	6.266	7.010	7.750	8.770									
3	89.3	4.290	5.327	6.355	6.750	7.371	8.200	9.070	10.000									
	101.6		6.110	7.294	7.770	8.467	9.450	10.500	11.600									
4	114.3			8.234	8.770	9.563	10.600	11.700	12.800	14.000								
	127			9.174	9.770	10.659	11.800	13.000	14.300	15.600								
	139.7			10.113	10.800	11.755	13.000	14.300	15.700	17.100								
5	152.4			11.053	11.800	12.950	14.400	15.900	17.400	19.000								
	165.1			12.000	12.800	14.121	15.800	17.400	19.100	20.900								
	177.8			12.947	13.800	15.241	17.100	18.900	20.800	22.800								
6	190.5		90	13.894	14.800	16.349	18.400	20.400	22.500	24.700								
	203.2			14.841	15.800	17.484	19.700	21.900	24.200	26.600								
8	219.1						21.600	23.900	26.400	29.000	31.613	34.300	37.100	40.000				
	254											33.000	39.505	45.917	52.300			
	323.2												39.300	47.336	54.703	62.300		

DIN 2458

Outside Diameter of Pipe mm Series			Normal Wall Thick. mm	Conventional weights per unit length in kg/m (wall thickness in mm)														
				2	2.3	2.6	2.9	3.2	3.6	4	4.5	5	5.6	6.3	7.1	8		
21.3			2	0.952	1.08	1.20	1.32	1.43										
26.9			2	1.23	1.40	1.56	1.72	1.87										
33.7			2	1.56	1.78	1.99	2.20	2.41	2.67	2.93								
42.4			2.3		2.27	2.55	2.82	3.09	3.44	3.79	4.21	4.61						
48.3			2.3		2.61	2.93	3.25	3.56	3.97	4.37	4.86	5.34						
	51		2.3			3.10	3.44	3.77	4.21	4.64	5.16							
	57		2.3			3.49	3.87	4.25	4.74	5.23	5.83	6.41						
60.3			2.3				4.11	4.51	5.03	5.55	6.19	6.82						
		73	2.6			4.51	5.01	5.51	6.16	6.81	7.60	8.38						
76.1			2.6				5.24	5.75	6.44	7.11	7.95	8.77						
88.9			2.9				6.15	6.76	7.57	8.38	9.37	10.30						
	101.6		2.9				7.06	7.77	8.70	9.63	10.80	11.90						
114.3			3.2					8.77	9.83	10.90	12.20	13.50	15.00	16.80				
	127		3.2					9.77	11.00	12.30	13.60	15.00	16.30	18.80	21.00			
139.7			3.6					10.80	12.10	13.40	15.00	16.80	18.50	20.70	23.20			
		152.4	4.0					11.80	13.20	14.60	16.40	18.20	20.30	22.70				
		159	4.0					12.30	13.80	15.30	17.10	19.00	21.20	23.70	26.60	29.80		
168.3			4.0					14.60	16.20	18.20	20.10	22.50	25.20	29.20				
219.1			4.5						21.20	23.80	26.40	29.50	33.10	37.10	41.60			
273.0			5.0								33.00	36.90	41.40	46.80	52.30			
323.9			5.6								39.30	44.00	49.30	55.50	62.30			

SQUARE AND RECTANGULAR TUBES



SIDE LENGTH (mm)	Theoretical weights per unit length in kg/m (wall thickness in mm)								
	1.50	2.00	2.50	3.00	4.00	5.00	6.00	7.00	8.00
25x25		1.440	1.766						
30x30		1.750	2.160						
32x32		1.884	2.315						
35x20	1.220								
35x25	1.340	1.750							
35x30	1.460	1.910							
35x35	1.570	2.070	2.540						
38x38	1.719	2.261	2.787						
40x15	1.220								
40x20	1.340	1.750							
40x25	1.460	1.910	2.340						
40x30	1.570	2.070	2.540						
40x40	1.810	2.380	2.930	3.330					
50x10		1.750							
50x20	1.570	2.070	2.540						
50x25	1.690	2.220	2.740						
50x30	1.810	2.380	2.930	3.330					
50x35	1.931								
50x40	2.050	2.690	3.330	3.800					
50x50	2.280	3.010	3.720	4.280	5.610				
50.8x50.8	2.322	3.064	3.791	4.503					
60x20		2.380	2.930						
60x25		2.543	3.140						
60x30	2.050	2.690	3.330	3.800					
60x33	2.119	2.794	3.454	4.097					
60x40	2.280	3.010	3.720	4.280					
60x50	2.520	3.320	4.110	4.750					
60x60		3.640	4.500	5.220	6.760				

*Hot-rolled material.

SQUARE AND RECTANGULAR TUBES



SIDE LENGTH (mm)	Theoretical weights per unit length in kg/m (wall thickness in mm)							
	2.00	2.50	3.00	4.00	5.00	6.00	7.00	8.00
70x40	3.328	4.110	4.750	6.406				
70x50	3.640	4.500	5.220	6.760				
70x70	4.260	5.290	6.160	8.020				
76x76	4.650	5.770	6.870	9.040				
80x30	3.320	4.110	4.750	6.400				
80x40	3.640	4.500	5.220	6.760				
80x60	4.260	5.290	6.160	8.020				
80x70	4.580	5.680	6.630	8.660				
80x80	4.890	6.070	7.100	9.280				
90x30	3.640	4.500	5.220	6.760				
90x50	4.260	5.290	6.160	8.020				
90x60	4.580	5.680	6.630	8.660				
90x70	4.890	6.070	7.100	9.280				
90x90	5.520	6.860	8.040	10.500				
100x40	4.260	5.290	6.160	8.020				
100x50	4.580	5.680	6.630	8.660				
100x60	4.890	6.070	7.100	9.280				
100x80	5.520	6.860	8.040	10.500				
100x100				11.800	14.400	17.710	20.443	23.112
120x40	4.890	6.070	7.100	9.280				
120x60	5.520	6.860	8.040	10.500				
125x75				11.800	14.400	17.710	20.443	23.112
150x150				18.339	22.767	27.131	31.434	35.673
200x100				18.339	22.767	27.131	31.434	35.673

*Hot-rolled material.

PRODUCTION STANDARDS

DIN 2395, DIN 59411,

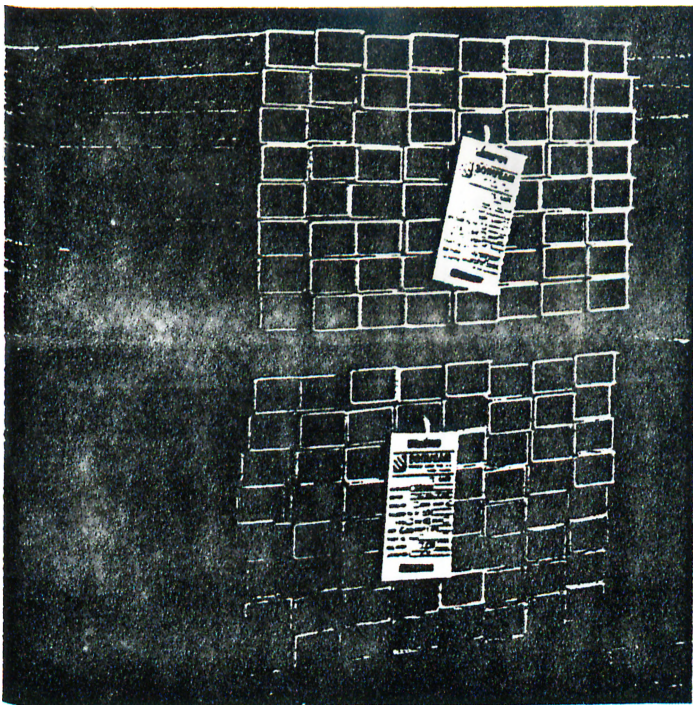
BS 4848, BS 6363, BS 6323,

ASTM A 500,

NFA 49643, NFA 49541,

GOST 8639, GOST 8645

Other standards upon request.



PACKING

Bare bundles.

Special packing upon request.

INSPECTION

- Mill's certificate.
- Inspection by an independent organization authorized by the customer.

TESTS PERFORMED

As required by the standards.

SURFACE COATING

Black, self-colored and pickled, oiled.

Outside mill protective coating (oil).

SQUARES AND RECTANGLES

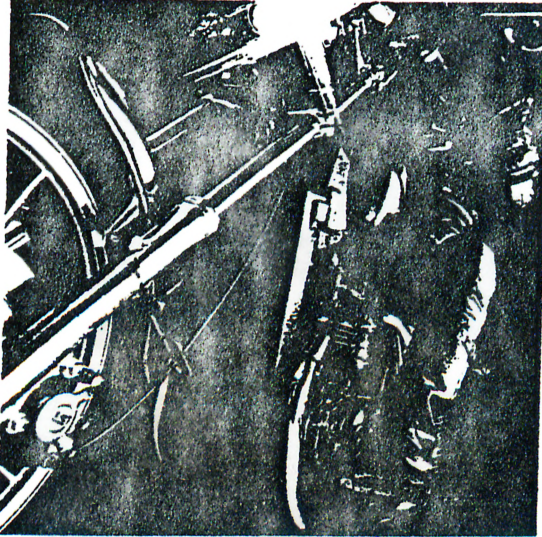


SQUARE TUBING							
SIDE LENGTH (in)	WT (in)	WEIGHT (Calculated)		SIDE LENGTH (in)	WT (in)	WEIGHT (Calculated)	
		(lb/ft)	(kg/m)			(lb/ft)	(kg/m)
1/2x1/2	0.039	0.240	0.357	1 1/2x1 1/2	0.039	0.770	1.150
1/2x1/2	0.047	0.283	0.421	1 1/2x1 1/2	0.047	0.922	1.370
1/2x1/2	0.056	0.329	0.490	1 1/2x1 1/2	0.056	1.090	1.620
1/2x1/2	0.063	0.363	0.540	1 1/2x1 1/2	0.063	1.220	1.810
5/8x5/8	0.039	0.306	0.456	1 1/2x1 1/2	0.072	1.380	2.060
5/8x5/8	0.047	0.363	0.540	1 1/2x1 1/2	0.078	1.490	2.220
5/8x5/8	0.056	0.424	0.631	1 1/2x1 1/2	0.083	1.580	2.350
5/8x5/8	0.063	0.470	0.699	1 1/2x1 1/2	0.095	1.790	2.660
5/8x5/8	0.072	0.526	0.783	1 1/2x1 1/2	0.120	2.210	3.290
3/4x3/4	0.039	0.373	0.555	1 1/2x1 1/2	0.125	2.290	3.410
3/4x3/4	0.047	0.443	0.659	2x2	0.120	2.94	4.38
3/4x3/4	0.056	0.519	0.773	2x2	0.125	3.05	4.54
3/4x3/4	0.063	0.577	0.859	2x2	0.156	3.70	5.50
3/4x3/4	0.072	0.649	0.965	2x2	0.180	4.17	6.21
1x1	0.039	0.505	0.752	2x2	0.188	4.31	6.42
1x1	0.047	0.603	0.897	2x2	0.250	5.40	8.04
1x1	0.056	0.710	1.060	3x3	0.120	4.57	6.81
1x1	0.063	0.791	1.180	3x3	0.125	4.75	7.07
1x1	0.072	0.893	1.330	3x3	0.156	5.82	8.66
1x1	0.078	0.960	1.450	3x3	0.180	6.62	9.85
1x1	0.083	1.010	1.510	3x3	0.188	6.86	10.20
1x1	0.095	1.140	1.700	3x3	0.250	8.80	13.10
1x1	0.120	1.390	2.070	4x4	0.120	6.21	9.23
1x1	0.125	1.440	2.150	4x4	0.125	6.45	9.60
1 1/4x1 1/4	0.039	0.638	0.949	4x4	0.156	7.94	11.30
1 1/4x1 1/4	0.047	0.762	1.130	4x4	0.180	9.07	13.50
1 1/4x1 1/4	0.056	0.900	1.340	4x4	0.188	9.41	14.00
1 1/4x1 1/4	0.063	1.010	1.500	4x4	0.250	12.20	18.20
1 1/4x1 1/4	0.072	1.140	1.690	4x4	0.312	14.80	22.00
1 1/4x1 1/4	0.078	1.230	1.820	4x4	0.375	17.30	25.70
1 1/4x1 1/4	0.083	1.300	1.930	6x6	0.180	14.00	20.80
1 1/4x1 1/4	0.095	1.470	2.180	6x6	0.188	14.50	21.60
1 1/4x1 1/4	0.120	1.900	2.680	6x6	0.250	19.00	28.30
1 1/4x1 1/4	0.125	1.870	2.780	6x6	0.312	23.30	34.70
				6x6	0.375	27.50	40.90
				6x6	0.188	14.50	21.60
				6x6	0.250	19.00	28.30
				6x6	0.312	23.30	34.70
				6x6	0.375	27.50	40.90

SQUARES AND RECTANGLES



RECTANGULAR TUBING							
SIDE LENGTH (in)	WT (in)	WEIGHT (Calculated)		SIDE LENGTH (in)	WT (in)	WEIGHT (Calculated)	
		(lb/ft)	(kg/m)			(lb/ft)	(kg/m)
1 x 1/2	0.039	0.373	0.555	4x2	0.120	4.57	6.81
1 x 1/2	0.047	0.443	0.659	4x2	0.125	4.75	7.07
1 x 1/2	0.056	0.519	0.773	4x2	0.156	5.82	8.66
1 x 1/2	0.063	0.577	0.859	4x2	0.180	6.62	9.85
1 x 1/2	0.072	0.649	0.965	4x2	0.188	6.86	10.20
				4x2	0.250	8.90	13.10
1 1/2x3/4	0.039	0.572	0.851				
1 1/2x3/4	0.047	0.683	1.020	5x3	0.120	6.21	9.23
1 1/2x3/4	0.056	0.805	1.200	5x3	0.125	6.45	9.60
1 1/2x3/4	0.063	0.898	1.340	5x3	0.156	7.94	11.80
1 1/2x3/4	0.072	1.020	1.510	5x3	0.180	9.07	13.50
1 1/2x3/4	0.078	1.090	1.630	5x3	0.188	9.41	14.00
1 1/2x3/4	0.085	1.160	1.720	5x3	0.250	12.20	18.20
1 1/2x3/4	0.095	1.300	1.940	5x3	0.312	14.30	22.00
1 1/2x3/4	0.120	1.600	2.380	5x3	0.375	17.30	25.70
1 1/2x3/4	0.125	1.650	2.460				
				8x4	0.180	14.00	20.80
1 1/2x1	0.039	0.658	0.949	3x4	0.188	14.50	21.50
1 1/2x1	0.047	0.762	1.130	3x4	0.250	19.00	28.30
1 1/2x1	0.056	0.900	1.340	3x4	0.312	23.30	34.70
1 1/2x1	0.063	1.010	1.500	3x4	0.375	27.50	40.90
1 1/2x1	0.072	1.140	1.690	3x4	0.188	14.50	21.60
1 1/2x1	0.078	1.250	1.820	3x4	0.250	19.00	28.30
1 1/2x1	0.083	1.300	1.930	3x4	0.312	23.30	34.70
1 1/2x1	0.095	1.470	2.180	3x4	0.375	27.50	40.90
1 1/2x1	0.120	1.800	2.680				
1 1/2x1	0.125	1.870	2.780				
2x1	0.039	0.770	1.150				
2x1	0.047	0.922	1.370				
2x1	0.056	1.090	1.620				
2x1	0.063	1.220	1.810				
2x1	0.072	1.380	2.060				
2x1	0.078	1.490	2.220				
2x1	0.083	1.580	2.350				
2x1	0.095	1.790	2.660				
2x1	0.120	2.210	3.290				
2x1	0.125	2.290	3.410				

THE HALKALI WORKS**MANUFACTURING METHODS**

Seven pipe mills.

END USES

Machine parts, automobiles, bicycles, furniture, greenhouses, white goods, accessories, textile.

TYPES**1. Standard tubes**

Outside diameter: OD 4.7 mm - 70 mm
(0.185" - 2.75").

Wall thickness: 0.7 mm - 3.0 mm
(0.028" - 0.118").

Length: up to 8 m.

2. Precision Tubes

• Drawn tubes

Outside diameter: 8 mm - 70 mm.

Wall thickness: 0.7 mm - 4 mm.

Length: up to 8 m.

• Drawn-over-mandrel tubing (cylinder tubes)

Outside diameter: 14 mm - 60 mm.

Wall thickness: 0.6 mm - 2.5 mm.

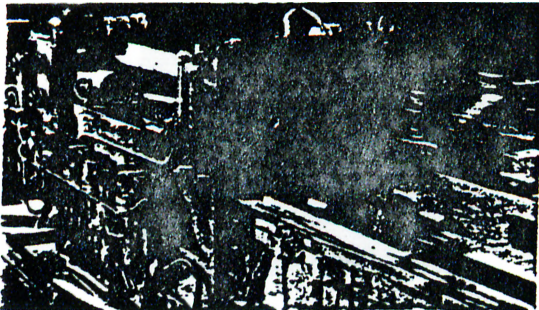
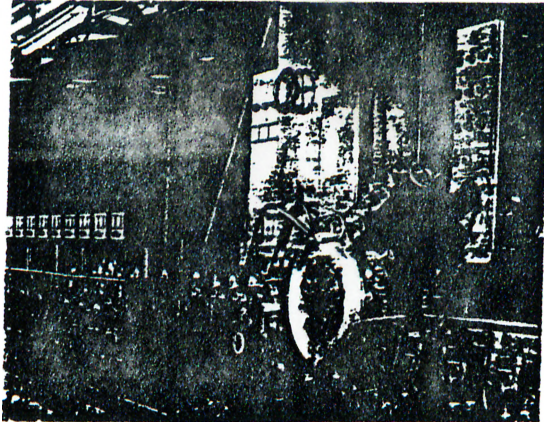
Length: up to 8 m.

• Swaged tubes

Outside diameter: 18 mm - 37.5 mm.

Wall thickness: 1.0 mm - 1.30 mm.

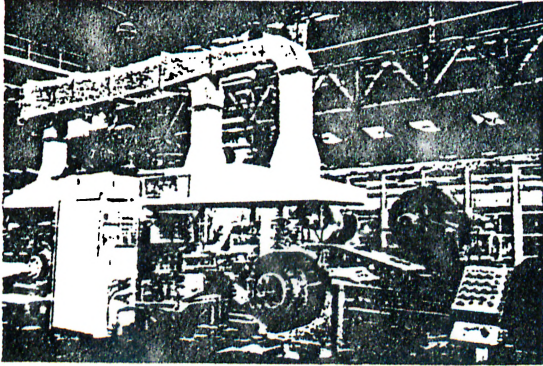
Length: up to 3.5 m.



- Special profiles and shapes (flat oval).

PIPE ENDS

Square-cut.



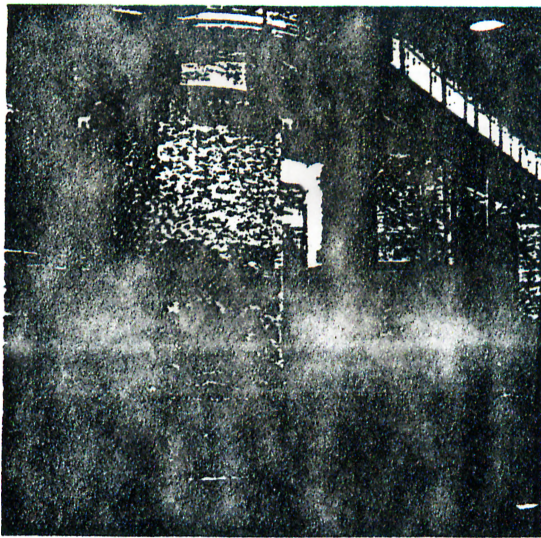
SURFACE CONDITION

- Hot-rolled; black/unpickled.
- Hot-rolled; pickled & oiled.
- Cold-rolled.

SURFACE COATING

Black, self-colored.

Outside mill protective coating (oil).



HEAT TREATMENT

Bright annealing.

Normalizing.

PRODUCTION STANDARDS

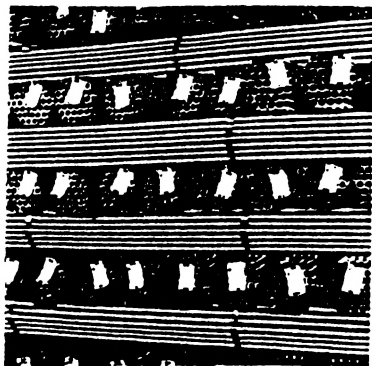
DIN 2393, DIN 2394,

BS 6323, BS 980.

ASTM A 500, ASTM A 513,

NFA 49643

Other standards upon request.



PACKING

Bare bundles.

Special packing upon request.

INSPECTION

- Mill's certificate.
- Inspection by an independent organization authorized by the customer.

TESTS PERFORMED

Hydrostatic tests.

Destructive tests.

Nondestructive tests.

Others as required⁹⁹ by the standards.

ERW PRECISION STEEL TUBES*

OD mm	Theoretical weights per unit in kg/m (wall thickness in mm)								
	0.70	0.80	1.00	1.20	1.50	1.80	2.00	2.50	3.00
4.7	0.069								
6	0.091	0.103							
8	0.126	0.142	0.173						
8.2	0.129	0.146	0.178						
8	0.126	0.142	0.173						
9	0.143	0.162	0.197						
10	0.161	0.182	0.222						
8.2	0.129	0.146	0.178						
11	0.178	0.201	0.247						
12	0.195	0.221	0.271						
13	0.212	0.241	0.296	0.349	0.425				
15	0.247	0.280	0.345	0.408	0.499				
16		0.300	0.370	0.438	0.536				
17		0.320	0.395	0.468	0.573	0.675	0.740		
18		0.339	0.419	0.497	0.610	0.719	0.789		
19		0.359	0.444	0.527	0.647	0.764	0.838		
20		0.379	0.469	0.556	0.684	0.808	0.888		
21		0.399	0.493	0.586	0.721	0.852	0.937		
22		0.418	0.513	0.616	0.753	0.897	0.986		
25		0.477	0.592	0.704	0.869	1.030	1.130		
25.4		0.485	0.602	0.716	0.884	1.048	1.154		
27		0.517	0.641	0.764	0.943	1.119	1.233		
28		0.537	0.666	0.793	0.980	1.163	1.282		
28.6		0.548	0.681	0.811	1.002	1.190	1.312		
30		0.576	0.715	0.852	1.050	1.250	1.380		
32		0.616	0.765	0.911	1.130	1.340	1.480		
35			0.838	1.000	1.240	1.470	1.630		
38			0.912	1.090	1.350	1.610	1.780	2.190	
40				1.150	1.420	1.700	1.870	2.310	
42				1.207	1.498	1.785	1.973	2.435	
45				1.300	1.610	1.920	2.120	2.620	
48				1.385	1.720	2.051	2.269	2.805	
51				1.474	1.831	2.184	2.417	2.990	3.551
54				1.563	1.942	2.317	2.565	3.175	3.773
55				1.590	1.980	2.360	2.510	3.240	3.850
57				1.651	2.053	2.450	2.713	3.360	3.995
60				1.740	2.160	2.580	2.960	3.550	4.220
63.5				1.844	2.294	2.739	3.033	3.761	4.476
70					2.530	3.030	3.350	4.160	4.960

- * - Up to and including 32 mm cold-rolled, hot-rolled pickled and oiled material.
- from 35 to 70 mm hot-rolled (dry, pickled and oiled) or cold-rolled material.
- up to and including 2.00 mm (wt) cold-rolled.
- 1.50-3.00 hot-rolled (dry and pickled and oiled).

APPENDIX

F

**STEEL PIPE MANUFACTURERS IN
TURKEY**

TABLE 4.

Company	Product Type	1993 Theoretical Capacity (tons)	Ownership	Location
Borusan Birleşik Boru	Longitudinally Welded	310,000	Private	Gemlik, Bursa
Mannesmann Sümerbank	Long. & Spiral Welded	115,000	Private	Halkalı, İstanbul.
Yücel Boru	Longitudinally Welded	160,000	State & Foreign	Izmit
Çayırova Boru (*)	Longitudinally Welded	180,000	Private	Çayırova, İstanbul
Erbosan	Longitudinally Welded	210,000	Private	Çayırova, İstanbul
Sevil Boru	Longitudinally Welded	140,000	Private	Kaysen
Bosaş Boru	Longitudinally Welded	90,000	Private	Ereğli
Profil Boru	Longitudinally Welded	40,000	Private	Traşon
Ümran Boru	Long. & Spiral Welded	30,000	Private	Kartal, İstanbul
		150,000	Private	Ümraniye
		250,000	Private	Akçakoca
Kartal Boru (**)	Longitudinally Welded	70,000	Private	Kartal, İstanbul
Noksel Boru	Spiral Welded	60,000	Private	İskenderun
Borutaş	Longitudinally Welded	25,000	Private	Adapazarı
Emek Spiral	Spiral Welded	50,000	Private	Ankara
Habaş	Spiral Welded	25,000	Private	Aliağa, İzmir
Erbotaş	Longitudinally Welded	40,000	Private	Ereğli
Depaş	Longitudinally Welded	40,000	Private	Denizli
Gabosan	Longitudinally Welded	40,000	Private	Gaziantep
Oto Profil	Longitudinally Welded	40,000	Private	Topkapı, İstanbul
Tüzün Boru	Longitudinally Welded	10,000	Private	Çobançeşme, İstanbul
Cstar Boru	Longitudinally Welded	10,000	Private	Kartal, İstanbul
MKEK	Seamless	20,000	Private	Kartal, İstanbul
Karapük DÇ.	Cast	10,000	State	Kırıkkale
(Not operating)		5,000	State	Karapük
Other	Longitudinally Welded	20,000	Private	Miscellaneous

(*)Yücel Boru

(**)Borusan.

These figures show the theoretical rather than actual capacities of the producers.

**Taken from Borusan Prospectus page 22