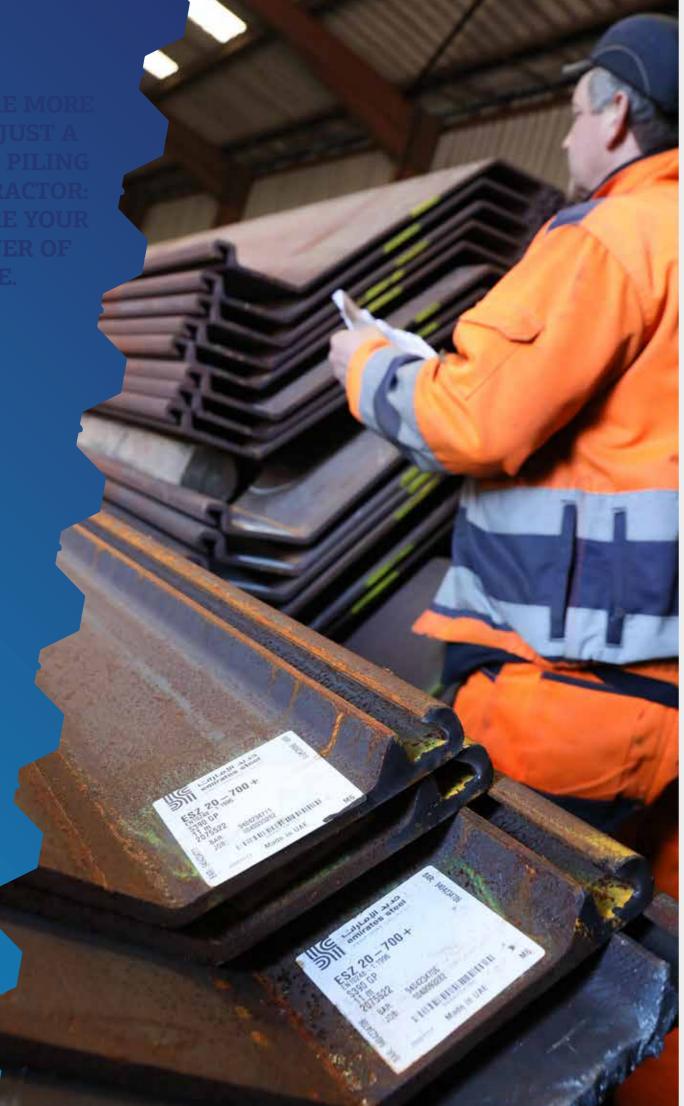


# בנג ועסונים emirates steel ESZ SHEET PILES



### INTRODUCTION

Hot rolled steel sheet piling has been manufactured and used in the construction industry for over 100 years. During this time the product has been continually developed and evolved to make it more useful, more efficient and more sustainable to modern construction projects.

Over the years the shape of sheet piles has developed. Initially the common sections were narrow 'U' shaped piles which were easy to drive but had very low weight efficiency. However as mill rolling capabilities improved it allowed wider pile sections to be rolled. This provided real savings in strength to weight ratios since the steel can be maximised in the flanges whilst increasing the overall depth of the sections.

Z section sheet piles were initially introduced in mainland Europe in the 1990's although there was an existing range named Frodingham sections in the UK already. The new range of Z section piles were far more efficient due to the increased width and hence the cost savings of these new Z sections could not be ignored.

#### The benefits of Z section sheet piles over traditional U sections are significant and include:

- Interlocks located on the flange thus giving optimised section profile for high strength and low weight.
- High inertia value enabling reduced deflections for serviceability.
- Efficient section with high bending capacity resistance.
- No reduction factors required on structural properties unlike 'U' section sheet piles.
- Greater section width providing:
- Reduced handling and installation time.
- Weight efficiency and cost savings.
- Enhanced water tightness.
- Incorporates proven Larssen interlock.

#### Sheet piles have numerous applications and uses within the construction industry including:

- Road Infrastructure.
- Rail Infrastructure.
- Ports & Harbours.
- Flood & Coastal Protection.
- · Permanent Basements.
- Commercial & Residential.
- Utilities.
- Temporary Works Applications.



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# **ABOUT EMIRATES STEEL**

#### **OUR JOURNEY: A History of Looking to the Future**

The story of Emirates Steel's creation is inextricably linked to the long-term economic plans and vision of the Abu Dhabi Government over 20 years ago.

Over 2 decades ago, in 1998, the General Holding Corporation (SENAAT), as it was previously known, took an active role in assisting the Government's efforts to diversify the country's economy. Fundamental to this goal was the desire to establish an industrial steel sector that would run in parallel with a growth strategy for other commodities aimed to increase the engineering and construction boom of the UAE. To balance Abu Dhabi's downstream private sector investments, SENAAT started a robust upstream steel business built out of one of its existing businesses called Emirates Iron and Steel Factory (EISF), which was located in Abu Dhabi's Industrial City.

EISF was the stepping stone for Emirates Steel's humble beginnings. The company's primary business of rerolling imported steel billets and producing rebar for the UAE market had barely sufficient capacity to meet the growing demands for quality steel products regionally and globally. It was not until October 2001 that the company commissioned its own dedicated rolling mill to start its own steel production facility, a phase that laid the foundation to what Emirates Steel signifies these days.

Commissioning of the rolling mill, RM1, was a proud achievement for Emirates Steel. Its design capacity of 500,000 metric tons per annum (MTPA) changed the course of Abu Dhabi and the UAE's steel industry. Since its commissioning, we have carried out constant improvement initiatives, taken optimized production planning measures and made ample technical modifications to improve RM1s capacity. As a result, RM1s capacity has increased over the years and the volume of our steel manufacturing ability has put us on the world map as a steel manufacturer of note for both domestic and international markets.

#### **OUR EXPANSION PROGRAM: Setting New Goals for the Future**

From being an imported steel rerolling business, to becoming the only full-fledged integrated steel manufacturing facility in the UAE, our resilient business model has been instrumental in our success.

Our business methodology and expansion plans have not only helped us add value to our business, but have helped us carve a niche for ourselves in the global steel manufacturing industry.

The direction in which we have driven our business has enabled us to stand out as one of the few domestic steel manufacturers with a portfolio of diverse products and solutions based expertise, including rebar in straight and coil forms, wire rods, sections, sheet piles and semi-finished products, such as billets and direct reduced iron.

The combined strategic ambitions of the Abu Dhabi Government, have helped shape the commercial and reputational growth of the company in recent years.

### **MILESTONES**

#### 1998 - January

Emirates Steel, under the SENAAT umbrella, is established as a result of the growing demand from the construction sector in the UAE for premium quality steel products.

#### 2001 - October

RM1 plant commissioned, and within two years, the plant is operating with a design capacity of 500,000 metric tons per annum (MTPA).

#### 2008 - February

Phase 2A Expansion Program launched, comprising of a 1.6 million MTPA DRP and a 1.4 million MTPA SMP plants.

#### 2009 - February

International certification body TUV Nord provides accreditation to Emirates Steel's proven environmentally friendly - Integrated Management System (IMS).

#### 2009 - June

Emirates Steel enhances its Environmental Monitoring Plan to fulfill the stringent requirements of the Environment Agency - Abu Dhabi (EAD), conducting regular stack monitoring for SOx, NOx, CO and PM as well as monitoring air emissions and quality.

#### 2014 - December

Emirates Steel begins production of sheet piles out of its central facilities in Abu Dhabi.

#### 2015 - February

Sheet Piling (UK) Ltd take delivery of the first shipment of Emirates Steel hot rolled sheet piles.

#### 2017 - January

Memorandum of Understanding (MoU) signed between Emirates Steel and Sheet Piling (UK) Ltd for the exclusive supply of Emirates Steel hot rolled sheet piles into the UK.

#### 2017 - April

Emirates Steel HSM successfully produces a new range of EZ18-700 family sheet piling sections.

#### 2017 - August

Emirates Steel receives Verification of Conformity Certification for production of Z section sheet piles to BS EN 10248 Part 1 & 2.

#### 2017 - November

Emirates Steel's DRP plant achieves an annual production record of 1,857,513 metric tons.

#### 2018 - October

Emirates Steel receives Italian Homologation Certification for Sheet Piles.

#### 2019 - October

Emirates Steel Awarded Two Patents by US Patent and Trademark Office.

#### 2020 - February

Emirates Steel receives the ISO 56002:2019 Innovation Management certification as the first steel manufacturer in the world and the first industrial company in the UAE to receive this certificate.

#### 2020 - November

Emirates Steel Receives Safety Culture & Leadership Award for World Steel Association.

#### 2020 - December

Sheet Piling (UK) Ltd reach a significant milestone of purchasing 50,000Te of hot rolled Z section sheet piles from Emirates Steel.

#### 2021 - April

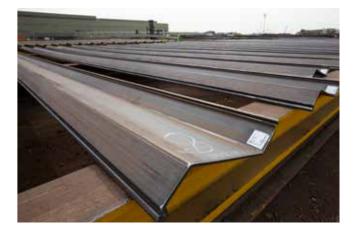
Emirates Steel successfully expand the range of hot rolled sheet piles to include the EZ38-700 family.

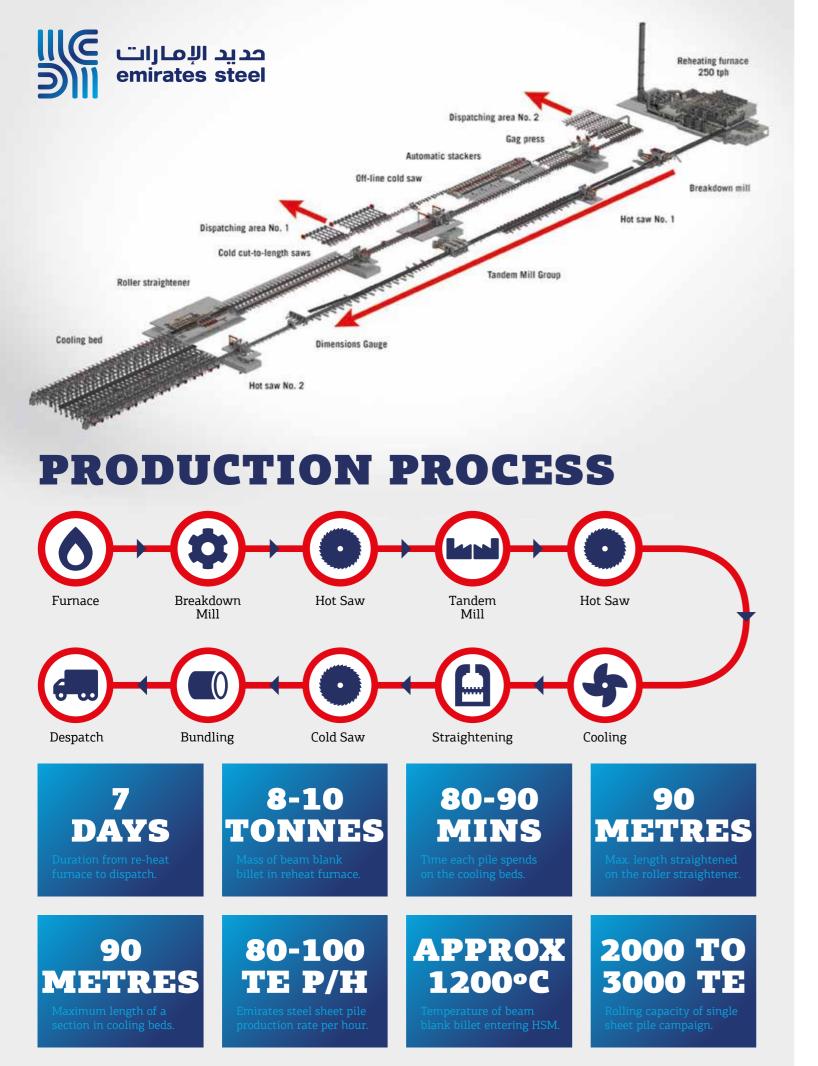




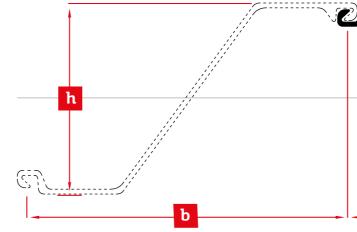








### **PRODUCT RANGE ESZ-SECTIONS**



ESZ-SECTIONS	Width	Height	Thic	kness	Sectional Area	Mass		Moment of Inertia	Elastic Section Modulus
	b	h	t	S		kg/m	kg/m <sup>2</sup>	I <sub>xx</sub>	W <sub>el</sub>
	mm	mm	mm	mm	cm <sup>2</sup> /m	of pile	of wall	cm <sup>4</sup> /m	cm <sup>3</sup> /m
ESZ17	700	420	8.5	8.5	134.6	74.0	105.7	36360	1735
ESZ18	700	420	9.0	9.0	140.9	77.4	110.6	37890	1805
ESZ19	700	421	9.5	9.5	147.1	80.8	115.4	39420	1875
ESZ20	700	422	10.5	10.5	159.3	87.5	125.0	42380	2010
ESZ24	700	459	12.0	9.0	162.9	89.5	127.9	55870	2435
ESZ26	700	460	13.0	10.0	176.0	96.7	138.1	59810	2600
ESZ28	700	461	14.0	11.0	189.1	103.9	148.4	63750	2765
ESZ36	700	509	14.0	11.5	211.5	116.2	166.1	91130	3580
ESZ38	700	510	15.0	12.5	226.0	124.2	177.4	96860	3800
ESZ40	700	511	16.0	13.5	240.5	132.2	188.8	102590	4015





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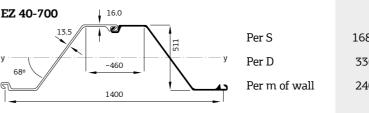


# **ESZ SECTION DATA**

Section	S = Single Pile D = Double Pile	Sectional Area	Mass	Moment of Inertia	Elastic Section Modulus	Radius of Gyration	Coating Area <sup>1</sup>
		cm <sup>2</sup>	kg/m	cm <sup>4</sup>	cm <sup>3</sup>	cm	m²/m
EZ 17-700							
	Per S	94.22	74	25452	1210	16.44	1.84
y 50° -332 y	Per D	188.44	148	50904	2425	16.44	3.68
	Per m of wall	134.6	105.7	36360	1735	16.44	2.63
<b>EZ 18-700</b> 9.0							
9.0	Per S	98.63	77.4	26523	1260	16.4	1.84
y y y	Per D	197.26	154.8	53046	2525	16.4	3.68
	Per m of wall	140.9	115.4	37890	1805	16.4	2.63
1400							
EZ 19-700							
95	Per S	102.97	80.8	27594	1310	16.37	1.84
yyy	Per D	205.94	161.6	55188	2625	16.37	3.68
	Per m of wall	147.1	125.2	39420	1875	16.37	2.63
EZ 20-700							
10.5	Per S	111.51	87.5	29729	1405	16.32	1.84
yyy	Per D	223.02	175	59458	2810	16.32	3.68
	Per m of wall	159.3	125	42470	2010	16.32	2.63
EZ 24-700							
9.0	Per S	114.03	89.5	39109	1700	18.52	1.93
y y y	Per D	228.06	179	78218	3405	18.52	3.86
	Per m of wall	162.9	127.9	55870	2435	18.52	2.76
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Section	S = Single Pile D = Double Pile	Sectional Area	Mass	Moment of Inertia	Elastic Section Modulus	Radius of Gyration	Coating Area <sup>1</sup>
		cm <sup>2</sup>	kg/m	cm <sup>4</sup>	cm <sup>3</sup>	cm	m²/m
<b>EZ 26-700</b>   13.0							
	Per S	123.2	96.7	41867	1820	18.44	1.93
yy	Per D	246.4	193.4	83734	3640	18.44	3.86
	Per m of wall	176	138.1	59810	2600	18.44	2.76
EZ 28-700							
	Per S	132.37	103.9	44625	1935	18.36	1.93
y	Per D	264.74	207.8	89250	3870	18.36	3.86
	Per m of wall	189.1	148.4	63750	2765	18.36	2.76
·							
EZ 36-700							
	Per S	148.05	116.2	63791	2505	20.76	2.11
yyy	Per D	296.1	232.4	127582	5010	20.76	4.22
	Per m of wall	211.5	166.1	91130	3580	20.76	3.01
EZ 38-700							
	Per S	158.2	124.2	67802	2660	20.7	2.11
yyy	Per D	316.4	248.4	135604	5320	20.7	4.22
	Per m of wall	226	177.4	96860	3800	20.7	3.01
EZ 40-700							
13.5	Per S	168.35	132.2	71813	2810	20.65	2.11
yyyy	Per D	336.7	264.4	143626	5620	20.65	4.22
	Per m of wall	240.5	188.8	102590	4015	20.65	3.01
-							











### **STEEL GRADES**

Hot rolled steel piling is supplied according to EN 10248 Part 1.

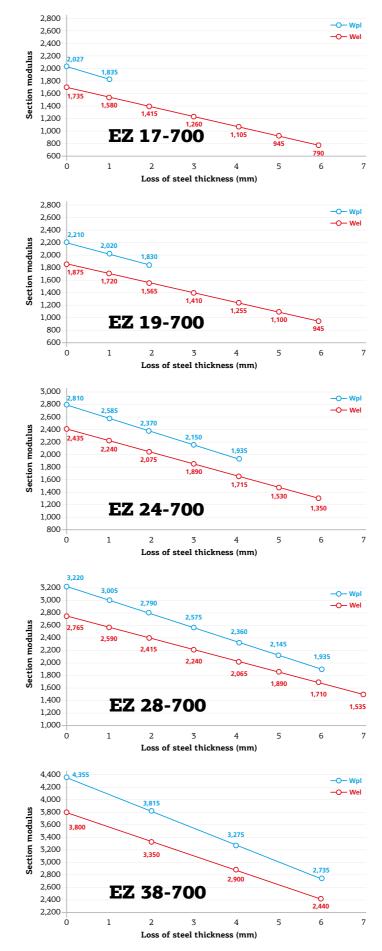
Steel grade EN 10248	Min. yield strength R <sub>eH</sub>	Min. tensile strength R <sub>m</sub>	Min. elongation $L_{o}=5.65 \sqrt{S_{o}}$	Chemical composition (% Max.)					
	MPa	MPa	%	С	Mn	Si	Р	S	Ν
S355 GP	355	480	22	0.27	1.70	0.60	0.055	0.055	0.011
S390 GP	390	490	20	0.27	1.70	0.60	0.050	0.050	0.011
S430 GP	430	510	19	0.27	1.70	0.60	0.050	0.050	0.011

### TOLERANCES

Hot rolled sheet piling products are supplied to EN 10248 Part 2. Standard hot rolled sheet piles can be manufactured in lengths up to 30.0m long.

Tolerances	ESZ Item	BS EN 10248-2
Width single pile (b) Width double pile (2b)		± 2% b ± 3% (2b)
Height (h)	h	h ≥ 300mm: ± 7mm
Thickness (t,s)		t, s ≤ 8.5mm: ± 0.5mm t, s > 8.5mm: ± 6%
<b>Straightness</b> (q)	q 4 L	≤ 0.2% L
Length (L)		± 200mm
Ends out of square (q)		2% b
Mass		± 5%

# **DURABILITY CHARTS**



#### SHEET PILING (UK) LTD





## SUSTAINABILTY

At Emirates Steel, we take our commitment to sustainability very seriously. To us, sustainability is more than a mere buzzword. Our efforts in this regard are well aligned with the UAE's long-standing national commitment to protecting its environment and natural resources. As a member of the Worldsteel Climate Action Programme, we are proud recipients of its Certificate of Recognition for our participation in the CO2 Emissions Data Collection Programme, an initiative that is made possible through our environmental partnership with Al Reyadda Carbon Capture Facility, located close to Emirates Steel's premises.

The main objectives of the project are to reduce the carbon footprint of the United Arab Emirates, implement enhanced oil recovery (EOR) in subsurface oil reservoirs. and free up natural gas that would otherwise have been used for oil field pressure maintenance.

We have also implemented a variety of initiatives to reinforce our sustainability credentials in the UAE. Our Integrated Management System is certified to the highest international standards under the CARES Sustainable Constructional Steel Scheme and BES 6001 for **Responsible Sourcing of Construction** Products. In keeping with these schemes, we comply with the issuance of Environmental Product Declaration Reports and certificates as needed.

Through using Emirates Steel products, customers and product developers are able to effectively meet local and international Green Building certification requirements. Furthermore, in order to reduce operating costs and increase feedstock flexibility, Emirates Steel has successfully commissioned its 3,000 HP Steel Scrap Shredding facility to feed the Electric Arc Furnaces of Steel Making Plants (SMPs). The new facility plays a major role in recycling steel

scrap generated in the UAE.

Emirates Steel is proud of its ethos that places innovation at the heart of our activities. In this context, we are continually seeking new synergies to advance our sustainability efforts through developing new systems and technologies to ensure our plants run at optimal environmental efficiency. One of our major partnerships aimed at converting the industrial waste "slag" from our plant into useable products.

In addition, we are collaborating with world renowned organisations for the agglomeration of internally generated materials at our plant. As part of Emirates Steel's Green Initiatives programme, our specific goal with this venture is to enable the reuse of steel mill by-products. Doing so allows us to create briquettes from our dust waste and reuse them in our Electric Arc Furnace. The recycling project is not only environmentally friendly but also reduces cost of steel production.

### **ENVIRONMENTAL POLICIES**

ENVIRONMENT AGENCY ABU DHABI As a commitment to run the business environment friendly manner, Emirates Steel is fully respecting and obeying national & international laws and regulations related to Environment Management. After demonstrating the compliance to all applicable environment regulations, Emirates Steel has obtained Environmental Permit from Environment Agency Abu Dhabi.

#### **SUSTAINABILITY**

To establish a dynamic framework to improve the energy and environmental performance of products and provide a robust and transparent mechanism for communicating the environmental performance, Emirates Steel has deployed Sustainable Constructional Steel requirements as per BS 8902 and obtained certifications for the same from UK CARES (CARES Appendices 01 & 05).

#### **PREVENTION OF POLLUTION**

Emirates Steel is implementing controls to ensure that the impact of our activities to the environment is at a minimum. We are regularly monitoring our emissions, discharges and wastes using laboratories and consultants approved by the relevant government agencies.

Air pollution treatment facilities are installed with continues emission monitoring system for real-time control and monitoring of emissions to ensure they are within the permissible limits.

Regular environmental inspections and audits are carried out in all areas to ensure compliance to environmental laws.

Carbon capture program, slag processing plant & fume treatments plats, etc. are our innovative projects to ensure sustainable work environment.

#### **RESPONSIBLE SOURCING**

To ensure that products have been made with constituent materials that have been responsibly sourced by addressing the organisational governance, supply chain management and environmental and social aspects, Emirates Steel has deployed BES 6001 requirements and obtained responsible sourcing certification from UK CARES.

# **QUALITY ASSURANCES**

Emirates Steel sheet pile sections are manufactured to BS EN 10248 standards and steel grades of S355GP, S390GP and S430GP are available. Steel sheet pile sections are manufactured by Emirates Steel in 0.1m increments and the tolerances on length are ±200mm. The maximum Emirates Steel pile section length is 30.0m.

In respect of Quality Assurance, Emirates Steel's 1.0million ton heavy section mill rivals the most advanced in the world, positioning the steelmaker at the centre of excellence for the manufacturing of steel sheet piles sections.

Emirates Steel is committed to the Health, Safety and Wellbeing of its employees. Furthermore, the company is committed to continued compliance to all environmental regulations to protect present and future environments.

#### **OUALITY CONTROL**

Emirates Steel maintains and operates the quality standards recognized throughout the world and our certificates are attached.

This QA system has the following objectives:

1. To guarantee the process conditions in all production stages, with regard to the physical, chemical and metallurgical characteristics.

2. To ensure thorough inspection of the finished product so as to guarantee full compliance with the specifications.

3. To collect, process and assess the obtained results in order to implement a system of continuous improvement.

#### **GLOBALLY RECOGNIZED QUALITY ASSURANCE SYSTEM**

In line with our vision to be a world class steel manufacturer. Emirates Steel has established a world class quality system which has been endorsed, certified & awarded by various national and international autonomous certification bodies from UAE, Kuwait, Malaysia India, United Kingdom, Italy, Germany, other European Union Countries, etc. As part of our business development and continual improvement strategy, we are within range of obtaining multiple certifications from other countries





such as Australia, Hong Kong, and many more.

As one of the key pillars of Emirates Steel's Management is 100% customer satisfaction & delight, our quality assurance system is designed to strictly ensure that products and services are fully met, as well as exceeding the needs, wants and expectation of customers and other stakeholders such as certification bodies and relevant regulatory bodies.

#### **CERTIFIED INTEGRATED** MANAGEMENT SYSTEM

To facilitate effective management of processes with a unified and effective direction across the organization, Emirates Steel has established an Integrated Management System (IMS) addressing the requirements and best practices of following Management Systems;

Quality Management System conforms to ISO 9001 certified by UK CARES (United Kingdom Certification Authority for Reinforcing Steel).

Environment Management System conforms to ISO 14001 certified by TUV Middle East.

Occupational Health and Safety



### **Z SECTION SHEET**



**Highways Infrastructure** 



**Railway Embankment Stabilisation** 

### **PILE USE CASES**



**Flood & Coastal Protection** 



**Commercial & Residential** 



**Permanent Sheet Pile Basements** 



**Marine & Waterways Projects** 



**Temporary Works** 



**Permanent Retaining Walls** 



**Reservoir Stabilisation** 





**High Speed Rail Infrastructure (HS2)** 



**Healthcare Projects** 



**Restricted Access Piling** 



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