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Since 1852

# **VULCAN IRON WORKS INC.**

**Preliminary Specifications for Vulcan 6250  
Offshore Pile Hammer**

**ESPECIALLY PREPARED FOR HYUNDAI HEAVY  
INDUSTRIES  
ULSAN, KOREA**

## GENERAL INTRODUCTION

In using a pile hammer to install ocean and coastal structures, the marine construction industry requires that the hammer

be economical to purchase and operate

be free of breakdowns and thus eliminate expensive downtime

be readily serviceable when service is necessary

As a product of many years of experience and development in all fields of pile driving, Vulcan air/steam powered pile hammers meet the above requirements with a design that is simple and rugged, manufactured to demanding specifications and field service that is available whenever and wherever needed. The 6250 continues that tradition with a number of improvements which make it the most advanced air/steam hammer on the market today.

The 6250 described in this bulletin has been developed specifically for marine construction. It is a single acting type hammer, and relies on gravity through a distance to achieve their striking energy. Single acting hammers are by far the most common in use, having proven their driving abilities on many structures throughout the world. It has a 113,398 kJ ram weight moving through an 1,829 mm stroke for a striking energy of 2033.7 kJ. The configuration of the hammer is shown in the general assembly drawing on the next page.

## THE HAMMER ITSELF

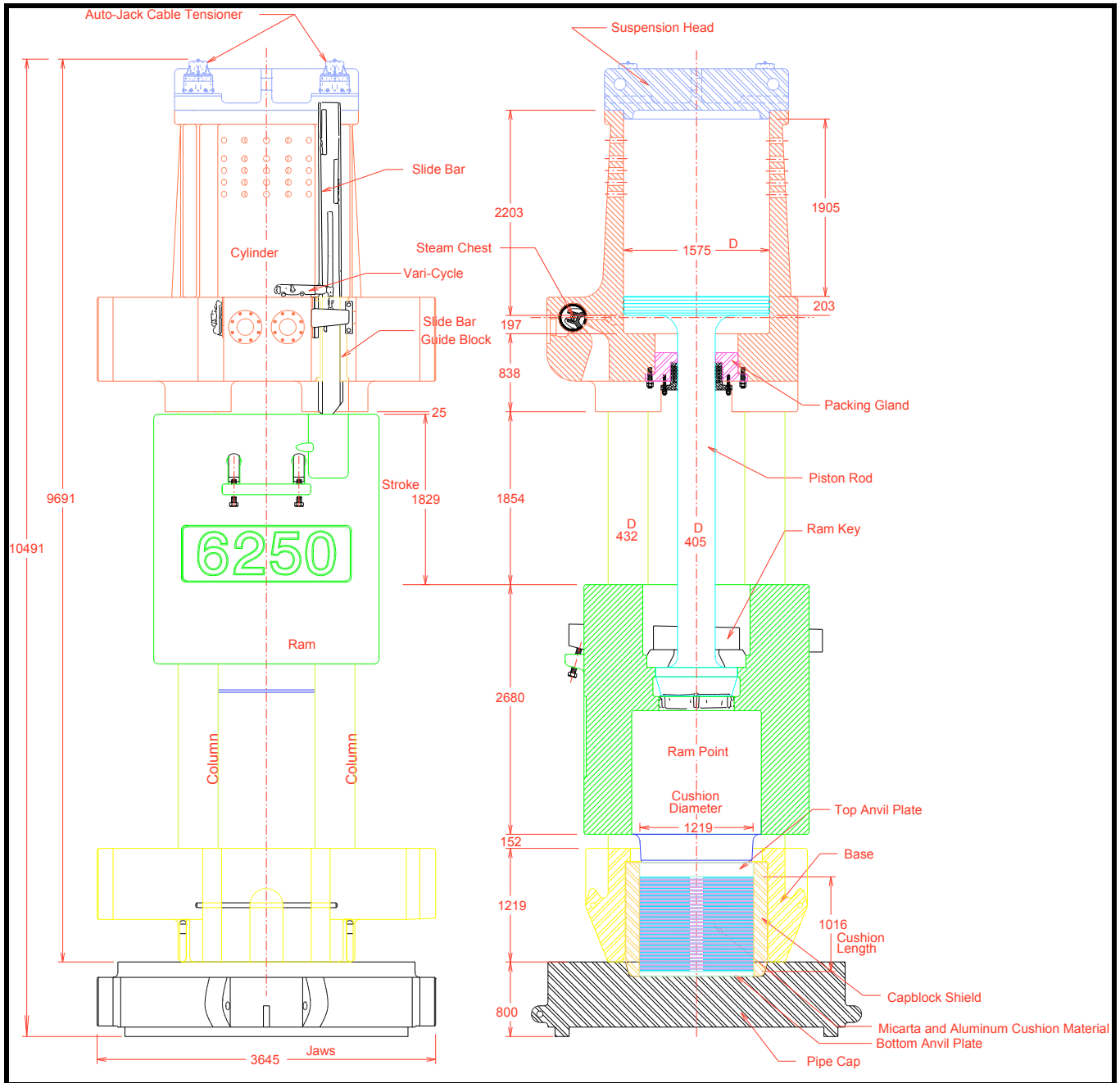
Much of the construction of the hammer is familiar to users of Vulcan equipment; some is novel to Vulcan hammers, but have been tested for years with other equipment. Some of the more important features are as follows:

□ *Vari-Cycle*: Located on top of the valve chest, the Vari-Cycle allows the operator to change the stroke (and thus the energy setting of the hammer) from the hammer

operator's station during driving, thus minimizing problems from both downtime and pile soil freeze.

- *Slide Bar Guide Block*: A new feature to Vulcan hammers, this wraps around the slide bar dovetail and thus both guides the slide bar and provides for a completely replaceable part for wear, thus eliminating brazing and welding repairs.
- *Slide Bar Gripper*: Located at the lower end of the slide bar, this secures the slide bar to the ram without tapered keys.
- *Ram Bushings*: The ram has bronze column bushings for maximum column bore life and minimum galling.
- *Micarta and Aluminum Cushion Material*: The 6250 is configured exclusively for this cushion configuration. Micarta and aluminum is a durable and economical material combination with many years of field operation.
- *Capblock Shield*: This is a cylindrical retainer for the cushion material. The shield is completely contained within the base, which provides for good alignment of all elements of the impact drive train.

# General Assembly of 6250 Hammer



## OPERATING CYCLE

Concerning the operation of the 6250, the cycle begins at impact, the valve is rotated in such a way as to admit steam or air into the cylinder and below the piston. This accelerates the ram upward as shown in View 1. This continues until the exhaust wedge on the slide bar actuates the trip and rotates the valve to close off the steam or air inlet and opens the area of the cylinder below the piston to the atmosphere where the compressed air or steam is exhausted. The

ram continues its free rise upward, decelerating with gravity until the top of the piston passes the relief ports and closes in the dashpot at the top of the cylinder. This trapped air, shown in View 2, compresses and brings the rising ram to a halt. The ram then makes a free drop to impact. Shortly before impact the intake wedge rotates the valve to admit steam or air to the cylinder and the cycle starts once again.

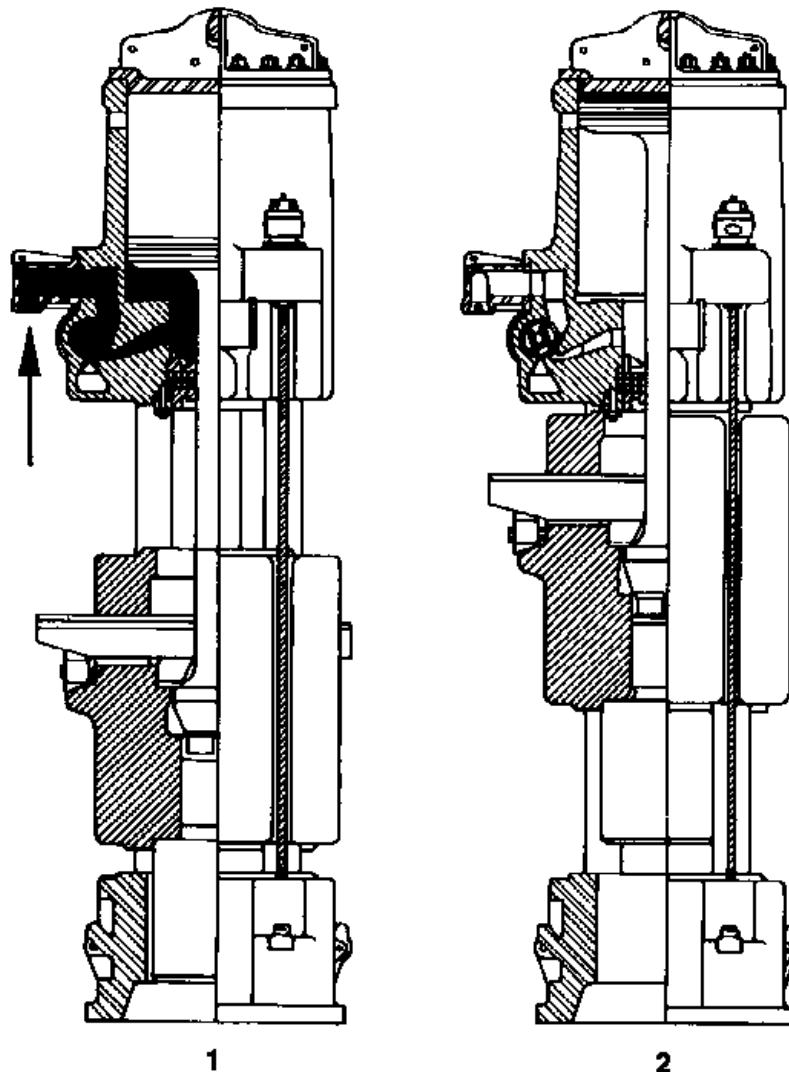


Figure 2 Operating Cycle of Vulcan Offshore Hammer

## PRELIMINARY SPECIFICATIONS FOR 6250 HAMMER

### SI UNITS

Rated Striking Energy, kJ	2033.7
Blows Per Minute – Normal Stroke, No Set	37
Normal Stroke, mm	1,829
Rated Operating Pressure @ hammer, bar	9.66
Steam Consumption, from & at 100° C, kg/hr	31,865
Boiler Horsepower, from & at 100° C	2,036
Boiler Horsepower, 16° C Feedwater	2,500
Air Consumption (Adiabatic), m <sup>3</sup> /min	525
Length of Hammer (overall), mm	9,691
Length of Hammer Assembly/Leaders (overall), mm	19,812
Largest Diameter Pile Permitted by Standard Jaws, mm	3,150
Size and Number of Hoses	6" (2)
Weight of Striking Parts, kg	113,398
Net Weight of Hammer (including capblock shield,) kg	226,795
Weight of Pipe Cap, kg	49,895
Weight of Leaders, kg	57,152
Assembled Weight, kg	333,842

### ENGLISH UNITS

Rated Striking Energy, ft-lbs	1,500,000
Blows Per Minute – Normal Stroke, No Set	37
Normal Stroke, in.	72
Rated Operating Pressure @ hammer, psig	140
Steam Consumption, from & at 212° F, lbs/hr	70,230
Boiler Horsepower, from & at 212° F	2,036
Boiler Horsepower, 60° F	2,500
Air Consumption (Adiabatic), cfm	18,513
Length of Hammer (overall), in.	382
Length of Hammer Assembly/Leaders (overall), ft.	65
Largest Diameter Pile Permitted by Standard Jaws, in.	124
Size and Number of Hoses	6" (2)
Weight of Striking Parts, lbs.	250,000
Net Weight of Hammer (including capblock shield,) lbs.	500,000
Weight of Pipe Cap, lbs.	110,000
Weight of Leaders, lbs.	126,000
Assembled Weight, lbs.	736,000

## ACCESSORIES AND SUPPORT

Vulcan offers a wide variety of accessories for the 6250 hammer. This includes:

*Pipe caps* – configured to adapt the hammers to various sizes of pipe piles up to the maximum size allowed by the leaders. Standard sizes for the 6250 are 2500mm and 3150mm.

When ordering, specify wall thicknesses of pipe piles. Accessories for other types and sizes of piles such as concrete piles are available upon request.

*Leaders* – Vulcan manufactures light weight, pipe construction leaders for low lift weight and maximum rigidity and ease on deck wear. The leaders include a lifting bale for handling of the unit and a roll bar at the base for smooth laying down of the equipment. Pipe cap gales are included to enable changing the pipe cap without removing the hammer from the leaders. Suspension cables for the hammer are furnished with the leaders.

*Cushion Material* – The 6250 is designed for use with micarta and aluminum to be used in a capblock shield. The shield is contained in the base and also aligns the base and the pipe cap. The cushion material is 48" (1219mm) in diameter and 40" (1016 mm) in depth. Twenty-seven (27) pieces of 1" (25mm) thick micarta and twenty-six (26) pieces of ½" (13mm) thick aluminum are alternated in the cushion stack.

*Other Accessories* – Vulcan can also furnish such accessories as steam or air hose and line oilers.

*Field Service and Parts* – Vulcan maintains a qualified field service staff for worldwide service and support of Vulcan pile driving equipment. Vulcan also maintains a large inventory of spare parts for all offshore hammers. Vulcan can also furnish commissioning services for new hammers as well as a comprehensive reconditioning program should the end user desire it.

## WARRANTY AND REPRESENTATIVE INFORMATION

### WARRANTY

Vulcan Iron Works Inc. warrants these products to be in accordance with our published specifications or those specifications agreed to by Vulcan in writing at the time of sale. Vulcan makes no other warranty, express or implied. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE ARE EXCLUDED FROM THIS WARRANTY. Our obligation and liability under this warranty is expressly limited to repairing or replacing, at Vulcan's option, any product which fails to meet these specifications within 180 days from date of initial use, but not to exceed one year from date of delivery. This remedy is exclusive and Vulcan's obligation does not include any transportation charges or costs of installation or any liability from direct, indirect or consequential damage or delay. If requested by Vulcan, products or parts for which a warranty claim is made are to be returned, transportation prepaid to Vulcan. Any improper use, operation beyond rated capacity as stated in the written specifications, substitution of parts not approved by Vulcan in writing, or any alteration or repair by anyone other than a duly authorized representative of Vulcan shall void this warranty.

#### BLOW COUNT SPECIFICATION

Vulcan hammers are designed to withstand a continuous driving resistance of 120 blows/foot (400 blows/meter). In addition to this, Vulcan hammers will withstand refusal driving resistance of 300 blows/foot (1000 blows/meter) for five (5) consecutive feet (1500mm), or 800 blows/foot (2600 blows/meter) for one (1) foot (300mm) or penetration. Any resistances experienced in excess of these are beyond rated capacity and will void the warranty. This definition is not an exclusive definition of excess of rated capacity and other criteria may apply.

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