

HIPPS

High Integrity Pressure Protection System



L&T Valves is a wholly owned subsidiary of Larsen & Toubro. Backed by a heritage of excellence that exceeds five decades, the company manufactures engineered flow-control solutions for key sectors of the economy.

Product Range:

- Gate, Globe & Check Valves
- Valves for Power
- Pipeline & Process Ball Valves
- Triple-offset Butterfly Valves
- Flanged & Wafer-type Butterfly Valves
- Double Block and Bleed Plug Valves
- Control Valves
- Customized Solutions including HIPPS

The valves are designed using state-of-the-art 3D design, simulation and analysis software. Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) are used to fine-tune product performance.

The Quality Management System of L&T Valves is certified to comply with ISO 9001 and API Spec Q1. The company is licensed to offer products monogrammed API 600, API 6D and API 609 as well as valves with CE Marking (Pressure Equipment Directive 97/23/EC) and ATEX certification (Council Directive 94/9/EC). Ball and Butterfly Valves with SIL 3 certification (IEC 61508) are also offered.

Valve manufacturing at L&T Valves leverages the best in technology and skill, and all manufacturing operations are guided by international safety, health and environment standards.

L&T Valves distribution network spans the globe, partnering key valve distribution companies in all major industrial centres.



High Integrity Pressure Protection System

L&T Valves offers a range of customised SIL 3 capable High Integrity Pressure Protection Systems (HIPPS) for over-pressure protection that leverages our expertise of over five decades in flow-control and system integration.

In industrial plants, flammable gases released by pressure relief valves during unplanned over-pressurization is primarily flared. Flaring and venting pose health and safety hazards and constitute a significant source of greenhouse gas emissions.

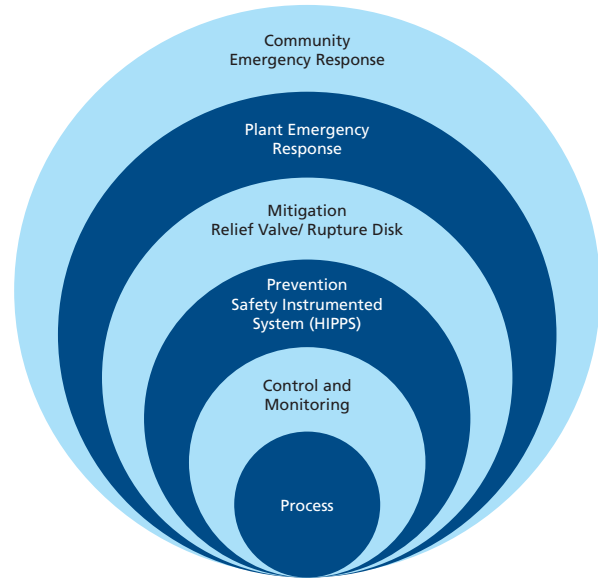
High Integrity Pressure Protection System (HIPPS) is a Safety Instrumented System (SIS), which by definition is a distinct, reliable system used to safeguard a process to prevent a catastrophic release of toxic, flammable, or explosive chemicals.

HIPPS can be employed to prevent over-pressurization of a plant by shutting-off the source of the high pressure gas rather than by releasing it to the atmosphere. This system closes the source of over-pressure within seconds and has at least the same reliability as a safety relief valve or flare system.

As per ASME Section VIII, UG-140, which covers 'Over-pressure Protection by System Design', HIPPS can be used for the following applications:

- Chemical reactions so fast the pressure propagation rate could result in loss of containment prior to the relief device opening
- Chemical reactions so fast the lowest possible relieving rate yields impractically large vent areas
- Exothermic reactions occurring at uncontrollable rates
- Plugging, polymerization, or deposition formed during normal operation
- Reactive process chemicals relieved into lateral headers with polymerization and thus plugging, rendering the relief device useless
- Multi-phase venting, where actual vent rate is difficult to predict





Codes & Standards

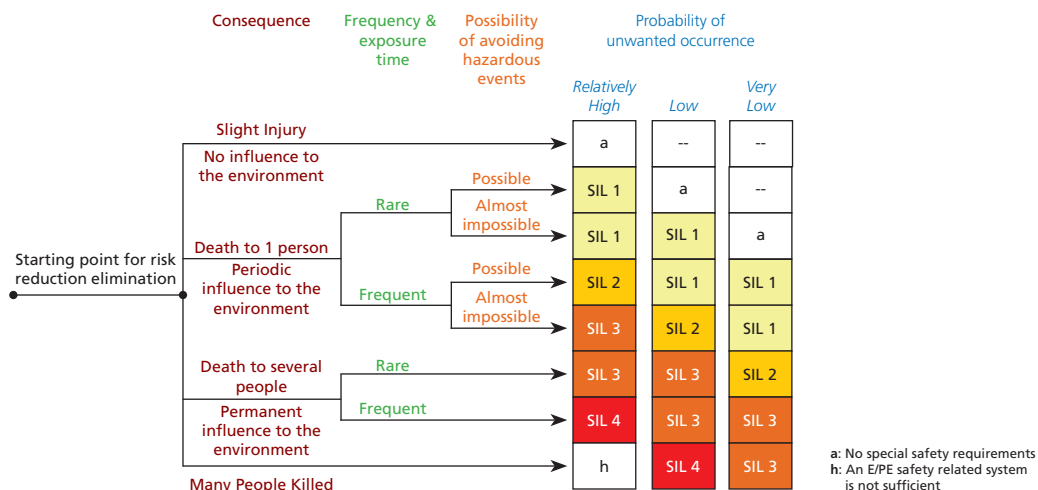
API 521 and ASME code case 2211 spell out the conditions when a SIS can be used as an alternative to a pressure relief device. HIPPS must provide an installation that is as safe as or safer than the pressure relief device that it replaces.

In addition, the SIS design must comply with international standards IEC 61511 and IEC 61508. IEC 61508 is a standard for functional safety of electrical, electronic and programmable electronic equipment and included mechanical components that are necessary to execute the safety function. IEC 61511 was developed for integrators, SIS designers and users as it deals with process sector implementation of the IEC 61508 standard. IEC 61511 has been adopted in the US as ANSI/ISA S84.00.01.

Implementing HIPPS as an SIS would result in risk reduction of the plant facility by prevention rather than mitigation. The recommended safety integrity levels for HIPPS would be either SIL 3 or SIL 4. The Risk reduction factor RRF and Average probability of failure on demand (PFD_{avg}) listed in IEC 61508 are:

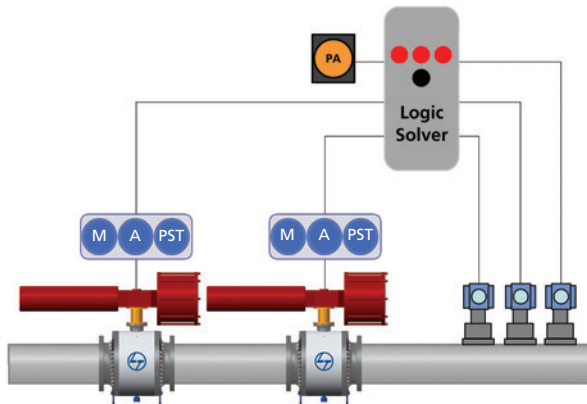
Safety Integrity Level	Risk Reduction Factor (RRF)	PFD (Avg. Probability of Dangerous Failure on Low Demand Mode)	PFH (Avg. Frequency of Dangerous Failure on High Demand Mode)
SIL 4	100,000 to 10,000	$\geq 10^{-5}$ to $< 10^{-4}$	$\geq 10^{-9}$ to $< 10^{-8}$
SIL 3	10,000 to 1000	$\geq 10^{-4}$ to $< 10^{-3}$	$\geq 10^{-8}$ to $< 10^{-7}$
SIL 2	1000 to 100	$\geq 10^{-3}$ to $< 10^{-2}$	$\geq 10^{-7}$ to $< 10^{-6}$
SIL 1	100 to 10	$\geq 10^{-2}$ to $< 10^{-1}$	$\geq 10^{-6}$ to $< 10^{-5}$

IEC 61508 lists possible methods to determine applicable Safety Integrity Levels, such as Risk Graph Method given below.



Source - IEC 61508-5, Figure E.2 & DIN 19250

Components of a HIPPS system



A typical HIPPS system comprises the following:

- Three pressure sensors (2oo3 voting) that detect the over pressure in the line
- A logic solver which receives and processes the input signal from the sensors and transmits the output to the Solenoid Valve in the final element.
- A final element (Actuated Valve) which perform the emergency closure action via a Solenoid Operated Valve (SOV) to bring the process to a safe state. Typically, 3 SOVs are used - a manual-reset SOV (M), an auto-reset SOV (A) and one for Partial Stroke Testing (PST).

The above schematic is a typical HIPPS architecture and the components in the loop can vary according to the application. L&T Valves can also offer ready-to-fit skids designed to meet customer specifications.

Pressure Transmitters

The pressure transmitters detect the high pressure in the system and the safety loop may include a minimum of three transmitters, which operate in a 2oo3 voting logic, to achieve the SIL 3 requirement. Thus failure of one transmitter channel to respond will not affect safety integrity. If a fault develops on one transmitter channel this would be revealed by an alarm and can be intervened without causing HIPPS activation.

- Transmitters used in a voting arrangement are diverse, that is, of different manufacturers or technologies, to reduce the likelihood of common mode failures.
- Common pressure transmitters used employ capacitance, piezo-resistive or Silicon resonant technology.
- Based on the requirement, the three pressure transmitters can either be directly connected to the main line with double block and bleed valve arrangement or alternatively a High Integrity Manifold Block (HIMB) shall be used to connect Gauge Pressure Transmitters with process.
- When provided, HIMB shall have integrated block and bleed facility for three transmitters & shall be mechanically interlocked with tamper-proof facility in such a way that only one pressure transmitter can be isolated or vented at any one time.



Logic Solver

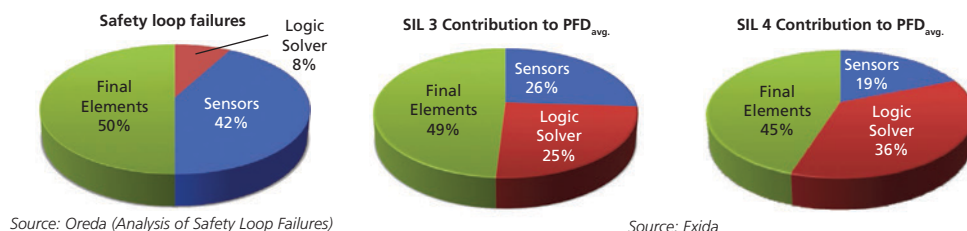


Control systems from L&T Electrical and Automation

The Logic Solver processes signals from the sensors and closes the final element by de-energising the SOV. The logic solver hardware must be designed to meet the SIL 3 performance requirements, as a minimum, in accordance with IEC 61508. The logic solver can be either solid state, or programmable electronic systems (PE). Programmable electronic systems are provided with additional self-diagnostics and fault tolerance.

Final Element

Final elements (Actuated Valves) are accorded the highest priority in a HIPPS loop as studies suggest that they account for 50% of safety loop failures historically and calculations suggest that their contribution to PFD_{avg} is the highest when compared with the sensors and logic solver. Thus selection and design of valves and actuator is of paramount importance in a safety loop.



Shutdown Valves

Selection of valves for HIPPS systems depends on reliability of the valve failure stroke, seat tightness, and impact of process conditions on valve drive train and seat design. A 1oo2 voting logic is normally specified for the HIPPS shutdown valves (in accordance with IEC 61511).



Trunnion-mounted Ball Valves (TMBV) are preferred for HIPPS applications as they provide the best flow performance for shut down applications.

Soft and metal seats can be offered.



Triple-offset Butterfly Valves (TOBV), can be used in clean tight shutoff applications such as LNG where pressure drop is not a concern.

The disc seat could either be a laminar seat or a solid seat based on the application.

Product Range and Options

Valve Types	Trunnion-mounted Ball Valve	Triple-offset Butterfly Valve
Sizes	2" to 56"	3" to 100"
Pressure Rating	Class 150 to 2500	Class 150 to 1500
Temperature Range	-196°C to 350°C	-196°C to 538°C
Seat Options	Soft Seat, Metal Seat	Metal-Graphite Laminated Seat, Solid Metal Seat
Body Materials	Carbon Steel, Stainless Steel, Duplex & Super Duplex Steels, Special Alloys, Carbon Steel with Stainless Steel/ Inconel Overlay	
Actuation Options	Pneumatic and hydraulic. Fail safe position provided by spring return.	

Features of Final Element:

- **Certified to SIL 3**

L&T Actuated TMBV and TOBV are certified to SIL 3 by an independent third party



- **Partial Stroke Testing (PST)**

Partial stroke testing capability is built into each HIPPS shutdown valve, for testing (closure limited to 30%) and real time diagnostics. The PST data could be recorded with remote status indication in SCADA or an equivalent protocol.

- **Fast Acting**

HIPPS valves designed to go from full open to full close in ≤ 2 seconds

- **Tight Shut-off**

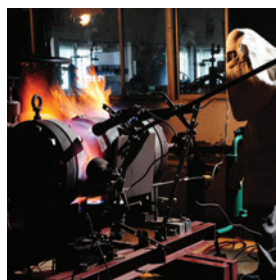
Leakage requirements as per Class V or VI of ANSI/ FCI 70-2

- **Fugitive Emission**

Meets ISO 15848-1 requirements

- **Fire Safe**

Valves fire safe tested to API 607 or API 6FA





L&T Valves Limited

Mount - Poonamallee Road, Manapakkam, Chennai 600 089, INDIA

Tel. : + 91 44 2249 8201 Email: ContactUs@Lntvalves.com www.Lntvalves.com CIN Number: U74999MH1961PLC012188

Registered Office: L&T House, N. M. Marg, Ballard Estate, Mumbai - 400 001, INDIA

Publication Number: VB001/1116

As we continuously endeavour to improve our products, the data given herein is subject to change.
Please refer www.Lntvalves.com for the latest publication.





A P Sales & Services

AN ISO 9001 : 2015 CERTIFIED COMPANY

Mob: 98491 48481

E-mail : sales@apsales.in



Certificate of Appointment

A P Sales & Services, Visakhapatnam

is appointed Authorised Distributor of
L&T Valves

R. Krishna Kumar
R Krishna Kumar
Head - India Sales

L&T Valves Limited, Mount - Poonamallee Road, Chennai - 600 085, INDIA, CIN: U74999MH1961PLC12188

भारत सरकार
Government of India
सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
Ministry of Micro, Small and Medium Enterprises

**UDYAM
REGISTRATION CERTIFICATE**

Our small hands to make you LARGE

TYPE OF ENTERPRISE	SMALL	MANUFACTURING																				
UDYAM REGISTRATION NUMBER	UDYAM-AP-18-000557																					
NAME OF ENTERPRISE	AP SALES & SERVICES																					
NAME OF UNITS	<table border="1"> <tr> <th>S.No.</th> <th>AP Units & Services</th> <th>Unit Name</th> </tr> <tr> <td>1</td> <td>AP Sales & Services</td> <td></td> </tr> </table>		S.No.	AP Units & Services	Unit Name	1	AP Sales & Services															
S.No.	AP Units & Services	Unit Name																				
1	AP Sales & Services																					
OFFICIAL ADDRESS OF ENTERPRISE	<table border="1"> <tr> <th>Plot/Shop/Block No.</th> <th>20-33-102/12</th> <th>Name of Premises/Building</th> <th>Not visible place</th> </tr> <tr> <th>Village/Town</th> <td>Sri Vishnu <th>Block</th> <td>G-9 </td></td></tr> <tr> <th>Post/Street/Lane</th> <td>Opp. Leela Mahal Theatre <th>City</th> <td>VISAKHAPATNAM </td></td></tr> <tr> <th>State</th> <td>ANDHRA PRADESH <th>District</th> <td>CHINAGANTYADA </td></td></tr> <tr> <th>Pincode</th> <td>530026 <th>Post Office</th> <td>CHINAGANTYADA </td></td></tr> </table>		Plot/Shop/Block No.	20-33-102/12	Name of Premises/Building	Not visible place	Village/Town	Sri Vishnu <th>Block</th> <td>G-9 </td>	Block	G-9	Post/Street/Lane	Opp. Leela Mahal Theatre <th>City</th> <td>VISAKHAPATNAM </td>	City	VISAKHAPATNAM	State	ANDHRA PRADESH <th>District</th> <td>CHINAGANTYADA </td>	District	CHINAGANTYADA	Pincode	530026 <th>Post Office</th> <td>CHINAGANTYADA </td>	Post Office	CHINAGANTYADA
Plot/Shop/Block No.	20-33-102/12	Name of Premises/Building	Not visible place																			
Village/Town	Sri Vishnu <th>Block</th> <td>G-9 </td>	Block	G-9																			
Post/Street/Lane	Opp. Leela Mahal Theatre <th>City</th> <td>VISAKHAPATNAM </td>	City	VISAKHAPATNAM																			
State	ANDHRA PRADESH <th>District</th> <td>CHINAGANTYADA </td>	District	CHINAGANTYADA																			
Pincode	530026 <th>Post Office</th> <td>CHINAGANTYADA </td>	Post Office	CHINAGANTYADA																			
DATE OF INCORPORATION/REGISTRATION OF ENTERPRISE	03/06/2014																					
DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS	03/06/2014																					
NATIONAL INDUSTRY CLASSIFICATION CODE(S)	<table border="1"> <tr> <th>S.No.</th> <th>NIC-2 Digit</th> <th>NIC-4 Digit</th> <th>Activity</th> </tr> <tr> <td>1</td> <td>28</td> <td>2812</td> <td>Manufacture of other pumps, compressors, taps and valves etc.</td> </tr> <tr> <td>2</td> <td>28</td> <td>2819</td> <td>Manufacture of other general purpose machinery except those intended for industrial applications, relevant bands for commercial, laboratory or industrial use and laboratory or other related machinery other than for research or glass, plastic and similar parts made of a combination of materials or those of like nature material and other general purpose machinery including manufacture of parts and accessories for general purpose machinery and equipment</td> </tr> <tr> <td>3</td> <td>35</td> <td>3512</td> <td>Repair and maintenance of pumps and related equipment, fluid power equipment, valves</td> </tr> </table>		S.No.	NIC-2 Digit	NIC-4 Digit	Activity	1	28	2812	Manufacture of other pumps, compressors, taps and valves etc.	2	28	2819	Manufacture of other general purpose machinery except those intended for industrial applications, relevant bands for commercial, laboratory or industrial use and laboratory or other related machinery other than for research or glass, plastic and similar parts made of a combination of materials or those of like nature material and other general purpose machinery including manufacture of parts and accessories for general purpose machinery and equipment	3	35	3512	Repair and maintenance of pumps and related equipment, fluid power equipment, valves				
S.No.	NIC-2 Digit	NIC-4 Digit	Activity																			
1	28	2812	Manufacture of other pumps, compressors, taps and valves etc.																			
2	28	2819	Manufacture of other general purpose machinery except those intended for industrial applications, relevant bands for commercial, laboratory or industrial use and laboratory or other related machinery other than for research or glass, plastic and similar parts made of a combination of materials or those of like nature material and other general purpose machinery including manufacture of parts and accessories for general purpose machinery and equipment																			
3	35	3512	Repair and maintenance of pumps and related equipment, fluid power equipment, valves																			
DATE OF UDYAM REGISTRATION	11/08/2020																					

राष्ट्रीय लघु उद्योग निगम लिमिटेड
THE NATIONAL SMALL INDUSTRIES CORPORATION LIMITED
(A Small Industry of India Enterprise)

Sr. No. 172477
S.No. 03-001208

Branch Office : D.No 6-47-27/23, Opp. Gajuwaka Police Station Main Gate, Sramika Nagar, Gajuwaka, Visakhapatnam - 530026
Ph : 0891-2705524 Fax : 0891-2705524
E-mail : nsi@nsic.co.in

Renewed Certificate (Valid From 22/09/2022 to 21/09/2024)
ANNEXURE TO GOVERNMENT PURCHASES ENLISTMENT CERTIFICATE
NO. NSIC/GP/SP/2020/041876 D.T. 23/11/2022
ISSUED TO: M/s. A P SALES & SERVICES, ANDHRA PRADESH

UNIT-1) Manufacturing: 6-58-16/1-01, Shramik Nagar, Drivers Colony, Chinagantyada, Gajuwaka, Visakhapatnam, ANDHRA PRADESH-530026

Sr.	Store(s)/ Service(s) Name	Specification(s)	Qualitative Capacity	Quantitative Capacity PA	Remarks
1	Soft Flat Graphite Metallic Cut gaskets	By using Graphite Metallic sheets	By thickness 0.5 mm to 3 mm	70000 pcs	
2	PTFE Flat cut Gaskets	By using Virgin PTFE and Carbon filled sheets		50000 pcs	
3	Fiber Based Aramid and Synthetic fibre flat cut gaskets	By using Fiber Based, Aramid and Synthetic fibre Sheets		50000 pcs	
4	Soft expanded PTFE (EPTFE) flat cut gasket	By using soft Expanded PTFE (EPTFE) sheets		50000 pcs	
5	Flat cut gaskets and washers	By using Rubber, NBR, EPDM, Silicon, nylon, viton sheets	By thickness 0.5 mm to 8 mm	100000 pcs	
6	Cardboard and caps	By using Cardboard sheets	By thickness 0.5 mm to 5 mm	100000 pcs	
7	Flat marphole gaskets in PTFE and rubber synthetic gaskets	By using PTFE and rubber synthetic sheets	By thickness 0.5 mm to 5 mm	10000 pcs	
8	Flat pump casing padings	By using Asbestos CAF sheets	By thickness 0.1 mm to 3 mm	10000 pcs	
9	Engine non asbestos cut gaskets	By using Non Asbestos CNAF sheets	By thickness 0.5 mm to 2 mm	10000 pcs	
10	Flange shims	By using MS, CS, SS, Aluminum, Copper, Brass	By thickness 0.5 mm to 30 mm	10000 pcs	

UNIT-2) Services: 6-58-16/1-01, Shramik Nagar, Drivers colony, Chinagantyada, Gajuwaka, Visakhapatnam, ANDHRA PRADESH-530026

Sr.	Name of Service/ Activities	Definition of Activity/ Service(s)	Quantitative Capacity/Service PA
1	Mix. A P Sales & Services		

Mix. A P Sales & Services can be checked through the web portal: www.apsales.in

CIN : U74140DL1955GOI00248 Gajuwaka, Visakhapatnam-530026

NFI
Certificate of Registration

This is to certify that the
Quality Management System
of
AP SALES & SERVICES
At
REG.OFFICE ADD: # 31-33-102/12, SHOP NO. G-9, Sri Vishnu Plaza, Opp. Leela Mahal Theatre, VISAKHAPATNAM-530026
FACTORY ADD: D.No. 6-58-16/1-01, SHRAMIK NAGAR DRIVERS COLONY CHINAGANTYADA, VISAKHAPATNAM-530026

has been independently assessed and
compliant with the requirements of:
ISO 9001:2015
Quality Management System
For the following scope of activities:

MANUFACTURING OF SOFT FLAT CUT GASKETS, CNMF, GRAPHITE METALLIC, PTFE CUT GASKETS & PTFE RODS AND BUSHES, FLAT RUBBER GASKETS, FIBER BASED CUT GASKETS, SOFT EXPANDED PTFE (EPTFE) CUT GASKET, SILICONE, EPDM, NBR FLAT CUT GASKETS, SERVICE PROVIDER FOR VALVE REPAIR, VALVE SERVICING, ASSEMBLY, HYDROSTATIC AND PNEUMATIC TESTING OF VALVES, AUTOMATION AND ASSEMBLY OF VALVES, ACTUATORS, REPAIR TESTING OF PNEUMATIC ACTUATORS, ELECTRIC ACTUATORS, GENERAL ENGINEERING FABRICATION WORKS.

Certificate Number:110461
Validity of this certificate can be verified at www.nficertifications.co.uk/verify

Date of Certification 28th JANUARY 2023
1st Surveillance Audit Due 27th JANUARY 2024
2nd Surveillance Audit Due 27th JANUARY 2025
Certificate Expiry (subject to the company maintaining its system to the required standard) 27th JANUARY 2026

Authorised Signatory CB-003

SUPPLY REFERENCES

AM/NS
INDIA

Coromandel

L&T Energy
Hydrocarbon

RAINCO

EMMAR

Biocon

VIZAG
STEEL
Pride of Steel

Bharat
Petroleum

HP

IndianOil

SA LPG

OFFICE : A P SALES & SERVICES

31-33-102/12, Shop No. G-9,
Sri Vishnu Plaza, Opp. Leela Mahal Theatre,
Dabagardens, Visakhapatnam - 20. Ph: 0891 - 2705522,
Mob : 98491 48481 | E-mail : sales@apsales.in

FACTORY ADDRESS:

6-58-16/1, Shramik Nagar, Drivers Colony
Chinagantyada, Gajuwaka, Visakhapatnam - 26
Ph: 0891 - 2705522 | Mob : 98491 48481
E-mail : sales@apsales.in