

# INDUSTRIAL EQUIPMENT

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## Flange Insulation Kit Gaskets

### Description

Flange Insulation Kit Gaskets are designed to combat the effects of corrosion often found in flanged pipe system. Galvanic corrosion between dissimilar metal flanges, flange insulation associated with cathodic protection of underground piping are other examples where "Spiraget" Flange Insulation Kit Gasket can be put to effective use.

The design and selection of materials used in "Spiraget" Flange Insulation Kit Gasket meet the twin purposes of sealing the flanged joints and insulation metal parts to prevent flow currents responsible for corrosion.

"Spiraget" Range Insulation Kit Gaskets are designed, manufactured & supplied in three types, TYPE-E for full face flanges, TYPE-F for raised face flanges and TYPE-D gaskets specifically designed to fit into the grooves of RTJ Flanges.

One gasket set Type "E" and type "F" comprises of:

- One central gasket of suitable thickness in flat section
- One full length insulating sleeve per bolt / Integral Washer Sleeve
- Two insulating washers per bolt
- Two metallic washer electro plated

### Advantages

Flange Insulation Kit Gaskets have high insulation values, durability, good mechanical properties, and are priced to customers needs

### Application

Flange Insulation Kit Gaskets control current flow and seal pipe flanges. Each kit is designed to address the unique requirements of pipe installation. Some industries using this product are Oil Refineries, Chemical & Process Plants, Thermal & Atomic Power Stations and Fertiliser Plants.

### Target countries

Most countries would benefit from this technology. Countries of special interest are Middle East, USA, and China.

### Collaboration Options

Marketing and Sales Agreement

### Organisation

IGP Engineers Pvt. Ltd.

### Specifications

	Insulation Gasket	Insulation Sleeve	Insulation Washer	Plated Washer
Standard	Neoprene faced Phenolic	Reinforced Phenolic	Reinforced Phenolic	Electroplated Steel Washer
Special	Neoprene faced Phenolic	Nylon	Nylon	-do-
	-do-	Mineral filled Nylon	Mineral filled Nylon	-do-
	-do-	Polyethylene	Polyethylene	-do-
	Glass Reinforced Epoxy (G-10)	Glass Reinforced Epoxy (G-10)	Glass Reinforced Epoxy (G-10)	-do-

## Kerb Laying Machine

### Description

Apollo KERBER is a compact machine for laying concrete kerb of different dimensions, through extrusion process. Designed and developed as an import substitute, it offers an economical and perfect solution for laying concrete kerbs. An automatic sensor provides steering and height control

The concrete can be fed into the machine from a concrete transit mixer or a flat bed truck (tractor trolley) by shoveling process.

### Advantages

The equipment is economical and the use of zero slump concrete ensures shape true to the mould design. Equipment produces concrete kerbs true to line, shape and level.

### Applications

The equipment is used for laying road side concrete kerbing: continuous laying of barrier, gutter and L-shape concrete kerbing. It can lay upto 450 mm height concrete kerbs.

### Target countries

African countries, CIS nations, Middle East countries, Australia, Malaysia, Bangladesh and Sri Lanka

### Collaboration Options

Marketing Collaboration

### Organisation

Gujarat Apollo Equipments Ltd.

### Specifications

Engine	16 HP Petrol Engine
Width	1150 mm
Length (w/o Mould)	1920 mm
Length (with Mould)	2700 mm
Height	1010 mm
Weight with Mould	900 kg
Steering Control	Auto/Manual
Height Control	Auto/Manual
Turning Radius	2.4 M
Accuracy	+/-3-5 mm
Compaction Method	Ramming
Moulds	Bolt on MS moulds to specifications
Accessories	String line & holders, finishing & cutting tools

# Asphalt Mixing Technology (Drum Mix Plant)

## Description

With years of experience in asphalt mixing, strategic technology tie-ups and an installed base of over 1000 plants, Gujarat Apollo has mastered the continuous Asphalt Mixing Technology. The world over, drum mix plants have produced millions of tons of quality asphalt.

The standard Apollo Drum Mix Plant comprises of cold aggregates bin feeders - Slinger conveyor - Dryer drum unit complete with drives, high pressure burner unit - Loadout conveyor with anti segregation gob hopper - Bitumen tank - Filler silo - Fully automatic air conditioned control cabin.

Optional attachments like storage silos for mixed material, wet dust collector for effective pollution control, Bitumen heating and storage tanks provided to suit specific needs.

## Advantages

The equipment has the following key features: It produces superior quality of mix. It has higher productivity and efficiency and low operating costs. The design is proven and the technology has automatic controls. Apollo provides excellent service back-up.

## Applications

The plant is used for producing asphalt mix used in roads and highways.  
Capacity: From 30 Tons per hour to 120 Tons per hour of asphalt mix

## Target countries

African countries, CIS nations, Middle East countries, Australia, Malaysia, Bangladesh and Sri Lanka

## Collaboration Options

Marketing Collaboration

## Organisation

Gujarat Apollo Equipments Ltd.

## Specifications

	DM-35 (30-45tph)	DM-60 (90-120 tph)
<b>Four Bin Feeder</b>		
Storage Capacity	31 tons	54 tons
Auxiliary Drive Motor	1.1 KW x 4 nos.	2.23KW x 4 nos.
Auxiliary Conveyor Belt	450mm x 2.2 m x 3 ply	450mm x 3.78m x 3 ply
Auxiliary Conv Gear Box	SMSR x 4 nos.	SMSR x 4 nos.
Gathering Drive Motor	3.73 KW	3.73 KW
Gathering Gear Box	SMSR	SMSR
Gathering Conveyor Belt	500mm x 22.45 m x 3 ply	600mm x 29m x 3 ply
Bin Vibrator (1 No.)	0.01 KW	0.01 KW
Feeding Capacity	100 tph	200tph
Overall Dimension (Approx)	12.50m x 2.55m x 2.45m	16.25m x 2.55m x 2.75m
Total connected load	8.0 KW	14.63 KW

## Specifications

	DM-35 (30-45tph)	DM-60 (90-120 tph)
<b>Over Size Removal Screen</b>		
Drive Motor	2.23 KW	2.23 KW
Wire Mesh	45mm x 45mm	45mm x 45mm
<b>Slinger Conveyor</b>		
Conveyor Drive Motor	3.73 KW	3.73 KW
Conveyor Drive Gear Box	SMSR	SMSR
Conveyor Belt	500mm x 15.025m x 3 ply	500mm x 15.025m x 3 ply
<b>Thermo Drum Unit</b>		
Drive Motor	11.18 KW	29.83 KW
Drive Gear Box	Heavy Duty Worm Gear	Heavy Duty Worm Gear
Drive Chain Pitch	63.5 mm	78.1mm
Main Burner Connected Power	150 lph/ 4.47 KW	770 lph/ 18.64 KW
Exhauster	5000 cfm	14500cfm
Exhaust Drive Motor	7.46 KW	18.64 KW
<b>Multiclone Primary Dust Collector</b>		
No. of Cones	5	21
Dust Screw Drive Motor	By Gravity	1.21 KW (flange mounted)
<b>Gob Hopper Capacity</b>		
Hyd. Power Pack	3.73 KW	3.73 KW
<b>Bitumen Tank</b>		
Capacity and Shape	15 tons (O shape)	20 tons (O shape)
Bitumen Drive Motor	3.73 KW	3.73 KW
Bitumen Gear Box	Heavy Duty Worm Gear	Heavy Duty Worm Gear
Bitumen Pump (Jacketed)	50.8mm x 50.8mm	50.8mm x 50.8mm
Hot Oil Drive Motor	0.75 KW	0.75 KW
Hot Oil Pump	19.05mm x 19.05 mm	19.05mm x 19.05 mm
<b>Mineral Filler Unit</b>		
Drive Motor	1.49 KW	1.49 KW
Drive Gear Box	Heavy Duty Worm Gear	Heavy Duty Worm Gear
Rotary Valve	203.2 mm	203.2 mm
Chain Pitch	25.4 mm	25.4 mm
Capacity	1.5 m <sup>3</sup>	1.5 m <sup>3</sup>
Air Compressor	5.59 KW	11.18 KW
<b>Total Connected Load</b>	<b>55.64 KW</b>	<b>119.77 KW</b>

Secondary pollution control unit is optional. Accessories include filler silo, bitumen tanks, hot oil heater and hot mix storage silo. Specifications also available for DM 45 and DM 50.

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# Mechanical Paver Finishers

## Description

The RM range of mechanical paver finishers is acknowledged as India's most preferred paver finisher.

## Advantages

The equipment has the following key features:

- Robust Construction
- Value for Money
- Ease of Operation
- High Uptime
- High Resale Value
- Ease of operation and maintenance

## Applications

The Paver Finisher is used for laying asphalt mix to build the roads.

Capacity: Upto 4m wide laying of asphalt mix

## Target countries

African countries, CIS nations, Middle East countries, Australia, Malaysia, Bangladesh and Sri Lanka

## Collaboration Options

Marketing Collaboration

## Organisation

Gujarat Apollo Equipments Ltd.

## Specifications

	Vibratory Screed	Combination Screed
Operating Height	2930mm	2930mm
Length	5680mm	5580mm
Operating Width	3230mm	3190mm
Wheel Base	2500mm	2500mm
Engine Rating	54 HP at 2300 RPM	65 HP at 2000 RPM
Battery	12V-21 Plates, Heavy Duty	12V- 21 Plates, Heavy Duty
Tyre-Front, Solid Rubber	558x405x180 mm	558x405x180 mm
Tyre-Rear, Pneumatic	11x20-16 ply	12x20-16 ply
Paving Thickness	10-200mm	10-200mm
Paving Speed	1.25-23m/minute	1.25-23m/minute
Paving Width	2.5-4m (Mech. Extension)	2.5-4m (Mech. Extension)
Travel Speed	0-16 KMPH	0-16 KMPH
Tampering Strokes	Not Applicable	0-3000 per minute
Screed Heating	2 Nos, Oil Burner	2 Nos, Oil Burner
Screed Extensions: 2 Nos	75mm, 150mm, 225mm, 300mm	75mm, 50mm, 225mm, 300mm

# Hydrostatic Sensor Paver Finisher

## Description

Apollo Hydrostatic Paver Finishers with Automatic Electronic Sensor Device is a pioneer in this field. These Pavers come with Hydrostatic drives, hydraulically extendable screed & contactless ultrasonic sensor controls for grade and slope control.

Variable displacement motor and pump provide infinitely variable paving and speeds. No mechanical shifting either in the pave or travel mode is required, it is effortless selection through fingertip.

## Advantages

The equipment has a proven technology. It lays mix with accurate grade and slope control. It has a long life and has low maintenance and service needs.

## Applications

The Paver Finisher is used for laying asphalt mix to build roads with using electronic sensor for accurate grade and slope.

Capacity: upto 5.5m wide laying of asphalt mix

## Target countries

African countries, CIS nations, Middle East countries, Australia, Malaysia, Bangladesh and Sri Lanka

## Collaboration Options

Marketing Collaboration

## Organisation

Gujarat Apollo Equipments Ltd.

## Specifications

	AP 500	AP 500 (Crawler Mounted)
Operating Height	2.51m	2.51m
Length	6.50m	5.65m
Operating Width	3.20m	3.20m
Tyres- Front	4 nos. 22x16x6	Crawler Chain
Tyres- Rear	4 nos. 9x20	Crawler Chain
<b>Engine</b>		
Make	AL 6.65 or equivalent	AL 6.65 or equivalent
Output @ 2400 RPM	108 PS	108 PS
<b>Performances</b>		
Laying Capacity	300 Tph	300 Tph
Paving Thickness	10 mm-300mm	10mm-300mm
Paving Speed- 1st Gear	0-80m/min	0-30m/min
Paving Speed- 2nd Gear	0-40m/min	
Travel Speed- 1st Gear	0-15Km/hr	0-91m/hr
Travel Speed- 2nd Gear	0-7.5Km/hr	

# Lubrication Systems

## Description

### Centralized Automatic Lubrication System (Single shot type)

It is an efficient, safe method lubrication system by which a pre-determined amount of oil is delivered to various lubrication points of machine from one central source. It is a total loss system and does not require any return line for collection of oil.

The lubrication unit (pump) feeds pressurised oil to the lubrication line installed on machine body. Metering cartridges screwed on manifolds eject preset amount of lubricant to individual point through tubing and fittings. During off time of lubrication pump, metering cartridges get recharged for next cycle. The ON-OFF cycle of system is controlled with the help of electronic controller which not only governs frequency (interval between two successive lubrication shots) of lubrication but also monitors oil pressure/oil level as well as lubrication fault.

This system comprises of motorised lubrication unit, metering cartridges (dozers), manifolds, fitting and tubing and electronic controller/ timer.

### Continuous Lubrication System

It is a system where oil keeps ejecting on friction areas and returns back to the tank of lubrication unit under gravity. Oil has to be filtered thoroughly when it falls at lubrication point.

The System comes with the following: Suitable reservoir with Baffles, Continuous Duty Motors TEFC, Positive Displacement Pump-Gear Lobe Type, Relief Valve, Inline Filter, Metering Valve, Return Line Filter, Restrictor Ejecting Oil, Instruments like pressure gauge with isolation valve, pressure switch, heater or cooler which is optional, and control panel to monitor pressure, level of oil tank, level of filtration etc.

### Multi Line Lubricator

Multi Line Radial Lubricator is a device meant to discharge metered amount of oil/grease from different plunger pumps housed in a common body. Each plunger delivers oil/ grease at a high pressure to the lubrication point independently.

The lubricator comprises of a single pumping station having a number of pump element assemblies placed radially and fitted onto the outer periphery of the housing. These pump elements are actuated by a cam which is rotated by a speed reduction drive coupled to an electric motor. The dose cycle of the pump-element is adjustable. Thus Multi Line Lubricator can have pump-elements ejecting different dose/cycle.

Multi Line Lubricators are also available in the following versions: Multi-line Axial, Pneumatically Operated Radial Lubricators.

### Oil Circulatory Lubrication System

These are closed loop systems. The oil is circulated from the reservoir to the lubrication point and then back to the reservoir. The design is as per DIN/API/ASME standards.

It can be supplied with accessories like differential pressure switch, temperature monitoring, oil level monitoring, and control panel for automation, valves, jack pumps, accumulators, piping and fittings.

### Centralised Grease Lubrication (Progressive Type)

This machine is used to supply grease in machines where lubrication points are limited. Grease is supplied either manually or through pneumatic pumps. It is delivered in calculated amount on each stroke of handle/ pneumatic cycle per minute.

The system comprises of Pumping Unit, Progressive Block and Tubing.

## Advantages

The key benefits of Centralised Automatic Lubrication System ( Single shot type) machine are:

- Less oil consumption
- Different oil dosages
- Prolonged life of machine
- Increased production
- Increased reliability
- Eliminates human error

The continuous lubrication system delivers continuous and accurate quantity of oil. The life of the machine is prolonged and the machines can operate in very harsh conditions.

Multi line lubricator is extremely versatile in terms of its application. It has scope for adaptation in metering of small quantity oil/grease. It provides additional protection against dirt. The built in pump elements work independently of one another and supply the lubrication point directly.

The oil circulatory lubrication system operates continuously in harsh environment. It provides precise individual lube point metering, control and monitoring

Centralised Grease Lubrication System (Progressive Type) delivers accurate amount of grease, it is economical and highly adaptable.

## Applications

Centralised automatic lubrication system (single shot type) finds application in machine tools; textile, pharmaceutical, printing, stone processing machines; packaging equipments; die casting, metal forming, rubber mixing, calendaring machines; injection/blow moulding machines; bottle forming/filling machines etc.

Continuous lubrication system finds application in reduction boxes, rubber machinery, die cast machinery, injection moulding machinery, press tools and crushers.

Multi line lubricator finds application in 2/4 stroke large diesel engines, compressors, construction and construction material machines, conveying installations, vehicle lubrication, hydro turbines and mixing plants etc.

Oil circulatory lubrication system finds application in paper industry, steel plants, sugar plants, cement plants, turbine generators, rubber mixing machines and high power electric drives etc.

Centralised grease lubrication system (progressive type) finds application in foundry machinery, metal forming machinery, presses and hammers, agriculture machinery, construction machinery, rubber processing machinery and earth moving equipment.

## Target countries

CIS countries, Taiwan, China, Brazil, Poland and Hungary

## Collaboration Options

Marketing Agreement.

## Organisation

Cenlub Industries Limited

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### Specifications of Centralized Automatic Lubrication System

Model of Unit	LP-2700S	ELU-2700	ALU-08
Reservoir Capacity	2.7 Litres	2.7 Litres	8 Litres
Discharge of Pump	0.6 LPM	0.8 LPM	1.5 LPM
Motor	0.09 KW, 4 Pole Single phase 220V	0.09 KW 4 Pole Single phase 220V	0.09 KW 4 Pole Single phase 220V
Relief Valve	Preset at 12 kg/ cm <sup>2</sup>	Preset at 12 kg/ cm <sup>2</sup>	Preset at 25kg/ cm <sup>2</sup>
Pressure Switch (rating)		42 V, max; 0.2 amp. Max with INO contact preset at 7 kg/cm <sup>2</sup>	220 V max; 5 amp, max; with INO+ INC contacts preset at 18 kg/cm <sup>2</sup>
Float Switch (rating)		42 V max, 0.2 amp max	220 V max, 1 amp max

All the above specifications are with respect to oil with viscosity 68 cSt/400°C.  
Two other models ALU-03 and ALU-05 available

### Specifications of Continuous Lubrication System

Model	ALU-20	ALU-50	ALU-120
Reservoir Capacity	20 Ltr	50 Ltr	120 Ltr
Discharge of Pump	1 LPM	4 LPM	10 LPM
Motor	¼ HP 3 Phase 4 Pole	½ HP 3 Phase 4 Pole	1 Hp 3 Phase 4 Pole
Line Pressure	3 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	7.5 kg/cm <sup>2</sup>
Relief Valve	5 kg/cm <sup>2</sup>	7 kg/cm <sup>2</sup>	10 kg/cm <sup>2</sup>
Pressure Switch (electrical rating)	220 V, 1 amp 1 NO+ 1 NC	220 V, 1 amp 1 NO+ 1 NC	220 V, 1 amp 1 NO+ 1 NC
Float Switch (electrical rating)	220 V, 1 amp 1 NO	220 V, 1 amp 1 NO	220 V, 1 amp 1 NO

Available in standard models: 20, 30, 50, 75 and 120 ltr  
Capacity with 1, 3, 4, 6 and 10 LPM Pumps with pressure rating of 5 kg/cm<sup>2</sup>

### Specifications of Multi Line Lubricator

Model	RL-1.5-4	RL 5-6	RL 10-12	RL 15-20	RL 70-30
Reservoir Capacity (L)	1.5	5	10	15	70
No. of outlets	4	6	12	20	30
Delivery Pressure kg/cm <sup>2</sup>	.....200 Max.....				
Dose of Pump/cycle- cc	.....0.05 to 0.25 (max 5 gm/ min) per pump element.....				
Reduction Ratio of Drive	.....70:1.....				
Power of Motor- HP	0.16	0.25	0.50	1.00	1.50
3 Phase, 415 V, AC, 4 Pole					
Overall size- mm L	400	440	600	650	800
W	250	310	350	380	500
H	400	480	650	805	1140

### Specifications of Oil Circulatory Lubrication System

Model	ALU-20	ALU-50	ALU-120
Reservoir Capacity- L	20	50	120
Discharge of Pump- LPM	1	4	10
Motor	¼ HP, 3 phase 4 Pole	¼ HP, 3 phase 4 Pole	1 HP, 3 phase 4 Pole
Pressure- kg/cm <sup>2</sup>	3	4	7.5
Relief Valve- kg/cm <sup>2</sup>	5	7	10
Pressure Switch	.....20V, max 1 amp with 1No+1 NC contacts.....		
Float Switch	.....220V, max 1 amp with 1No+1 NC contacts.....		

Other available models are ALU-30 and ALU-75

### Specifications of Centralized Grease Lubrication (Progressive Type)

Model	Pn-GP-30-10	Pn-GP-100-50
Reservoir Capacity	1.5 Kg	10 Kg
Discharge of Grease/ Pn cycle	3- 10 gm	5- 50 gm
Input Pneumatic Pressure	4-6 Kg/cm <sup>2</sup>	4-6 Kg/cm <sup>2</sup>
Max. Output Grease Pressure	100 Kg/cm <sup>2</sup>	150 Kg/cm <sup>2</sup>
Min. frequency of Operation	1 Min	1 Min
L x W x H in mm	275x160x280	500x200x1000

## Process Analyser Systems

### Description

Process Analyser System of Chemtrols provides various process, stack and ambient analysers as a totally integrated system under single point responsibility. During the last decade, Chemtrols has supplied over 60 such system in India to various refineries, petrochemicals and fertiliser plants.

The three analysers available are:

- Analyser Shelter with HVAC
- Environmental Monitoring System
- Stack Analyser System

### Advantages

The objective is to reduce operating and maintenance cost of the plants and to build systems of high quality, compiling with latest industrial standards. Thus, Chemtrols offer single source support, overall responsibility and guarantee for all process analyzers of the system.

### Application

These Analysers find application in:

- Moisture measurement in liquids and gases
- Stack analysers for SO<sub>2</sub>/ NO<sub>X</sub>/ CO/ HC/ HCl/ Ammonia
- Oxygen and combustible gases
- Opacity/ Dust analyzer
- Process Gas analysers like CO, CO<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub> etc
- Physical property analysers confirming to ASTM standards e.g. pour point, flash point, distillation, vapor pressure, viscosity etc
- Sulphur analysers from low ppb to % level in gases as well as in liquids
- NIR analysers for RON, MON, distillation, flash point etc
- Ambient air monitoring system
- Gas and flame detection system
- Tail gas and H<sub>2</sub>S analysers for Sulphur recovery plants

### Target countries

All countries

### Collaboration Options

Marketing Agreement.

### Organisation

Chemtrols Engineering Ltd

## Desuperheaters

### Description

The Chemtrol's Desuperheater DA-90 represents a new design in mechanically atomised spray nozzles. The DA-90 meets the market demand for desuperheaters giving a better operational economy and more efficient temperature control.

The DA-90 provides precise and economical control of the steam temperature by introducing cooling water to the steam flow through a unique single nozzle design. The nozzle produces a whirling thin-film spray pattern. Vaporisation is almost instantaneous as the water is injected into the steam flow. The single nozzle design eliminates the effect of large water droplet build-up, a phenomena that can occur when different spray patterns collide in a multi-nozzle unit.

The DA-90 is available in six different sizes and each size is in two versions depending on the pressure differential between the spray water and the steam header.

### Advantages

DA-90 has the following features and benefits:

- Higher efficiency by use of full pressure drop at all flow conditions
- Single nozzle - unique design guarantees fine water dispersion over the entire control range
- Tight shut-off-single seated design, hence no separate stop valve is necessary and no after dripping that can cause erosion of the steam pipe
- No control valve required - combines nozzle and control valve function in one unit
- High reliability - stellited seat and hard intruded control plug guarantees high operational reliability, a long operational life span and low operational and maintenance costs
- Compact design and easy installation - perpendicular to the steam pipe through a 3 in. flange connection or pressure seal bonnet with butt weld connection
- Suitable for many applications - Standard design ranges from pressure class. ANSI 150 to 2500. Withstands a pressure differential of up to 80 bar/ 1200 psi and can be supplied in different materials

### Application

Desuperheaters cover a wide range of applications, a great majority of which fall into the following standard installations:

- Power plant requirements of desuperheated steam supply, units having limited operating temperatures such as heating systems, heat exchangers, dump stations and evaporate
- To improve heat transfer of surface type heat exchangers
- Reduction and control of superheated steam where excess temperatures will harm the product
- On boilers, either between superheater stages or at the boiler exit to control superheat temperatures at partial loads
- As bypass on bleed or back pressure turbines to maintain balance between process steam and power requirements
- Miscellaneous applications where balancing or make-up steam is required in refineries and process plants

### Target countries

All countries

### Collaboration Options

Marketing Agreement

### Organisation

Chemtrols Engineering Ltd.

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### Specifications

Type	DA-90-Steam desuperheater with built-in water control valve
Designation DA-90 AB where	A=size 1-6; B=0; P= 3-40 bar/ 45-600 psi B=1; P= 30-80 bar/ 450-1200 psi
Control characteristic (integr. Control valve)	Almost equal percentage (logarithmic)
Pressure Class	Flanged steam connection ANSI 150-1500 -Butt weld connection ANSI 900-2500

Capacity-DA 90:

AB	Kv	Cv	AB	Kv	Cv
10	0.25	0.29	11	0.18	0.20
20	0.55	0.64	21	0.39	0.45
30	0.95	1.10	31	0.67	0.77
40	1.70	1.90	41	1.20	1.40
50	3.20	3.70	51	3.20	2.60
60	5.00	5.80	61	3.50	4.10

Max. steam temperature 545°C / 1010°F

**Material**

Housing	C 22.8 / A 105* A 182 - F 12 **
Stem/ Plug	AISI 420 SS; Stem : Hard chromed; Plug : Nitrided
Guiding ring	A 182- F12 Nitrided
Throttling ring	Stellite 6
Nozzle head / Seat	A 182 - f12 Seat : Stellite
Nozzle	AISI 616
Stuffing Box packing	Grafoil

**Actuator**

Type Pneumatic actuator with positioned is standard. Electric or electrohydraulic actuators on request.

Stroke	19 mm / 0.75 in.
Control signal	0.2 - 1.0 bar / 3-15 psi or 0 /4-20mA
Weight	Depends on pressure class and actuator. Average weight is 35kg/77 bs.

**FUNCTION**

In DA-90 the cooling water passes the seat through a specially designed nozzle head where the differential pressure between steam/cooling water is transformed to kinetic energy. The cooling water flows, at high velocity from the seat and via a slit in the plug, tangentially into a chamber where it obtains a high rotation velocity before being ejected into steam as a very finely dispersed, cone shaped spray.

## Level Transmitters

**Description**

The instrument measures and transmits liquid level, interface or density by sensing changes in buoyancy force exerted on a fixed displacer element. The buoyancy force is converted into standard output 4 - 20mA analogue or digital output.

Some of the key features of the transmitter are:

- Conventional operation with local keys
- Communication via HART Protocol
- Fast Adaptation to other measuring ranges without calibration in the workshop
- Continuous self diagnostics
- Level transmission by Torque Tube
- Process medium temperature from -1960C..... +400°C
- Pressure Class upto 2500/ PN 400
- Measuring principle ; thin film metal : Strain gauge element

**Advantages**

Level Transmitters have the following benefits:

- The simple design and rugged construction of this solid state instrument provide long lasting service with virtually no maintenance.
- This design provides for excellent linearity and repeatability, low hysteresis and long term stability
- It is easy to install

**Application**

Level Transmitter is specially designed to provide the convenience of direct submergence in many types of liquid for quick, accurate, and reliable level measurement.

**Target countries**

All countries

**Collaboration Options**

Marketing Agreement

**Organisation**

Chemtrols Engineering Ltd.

### Specifications

Buoyancy force	1 to 20N
Density Range	50 - 1500 kg/m <sup>3</sup>
Displacer Length (Std.)	350 - 3000 mm
Accuracy in % of Span	± 0.2%
Output	4-20mA
Communication	HART Protocol
Supply Voltage	DC 12 - 42V
Ambient Temperature	-400C.....+850C
Electrical Connection	1/2" NPT (F) between flanges, Top Mounting or Side Mounting with cage.
Certification	By Cenelec for Intrinsic Safety Exia IIC T4 or T6 By CMRI Dhanbad for Intrinsic Safety and Explosion proof II A & II B & II C



## Displacer Operated Level Switches

### Description

Level switches are used to detect specific liquid levels, or interfaces between liquids. These level measurements are indicated via an electrical switching action. The use of Displacers as the sensing medium allows for wide switching differential, field adjustable switching points and use on high pressure applications.

The displacer principle provides for wide switching differential and additionally allows altering of the switching point by moving the displacers up/down the suspension cable. Displacer type also can operate under higher pressure conditions because of greater wall thickness than floats.

Displacer type offers some alternate features to the float operated. The sensor is a weight (displacer) heavier than liquid, which is suspended by a spring. When liquid contacts the displacer, a buoyancy force is produced, which causes the effective weight of the displacer to change; this causes the spring to retract slightly to a new equilibrium position. When the spring retracts the attraction sleeve also moves upward into the field of the external magnet (thus overcoming the force of the bias spring and actuating the switching element).

### Advantages

Level Transmitters have the following benefits:

- Operates in most liquid
- Minimum maintenance with long and trouble free operation
- Low cost of ownership

### Application

Displacer operated Level Switches have the following applications:

- Alarm & shutdown duties
- Sump level control high pressures/low S.G
- Large switching differential for pump control

### Target countries

Developing countries

### Collaboration Options

Marketing Agreement

### Organisation

Chemtrols Engineering Ltd

### Specifications

Series 700 is designed for internal mounting through the top of the process vessel. Mounting connections are offered in 2.5 inch NPT and 3 inch flanges as a standard.

Specific gravities: 0.40 and higher

Pressure Ratings 143.0 bar at 40°C/40.0 bar at 250 °C

Others on request

Series 800 is equipped with a chamber and is designed for mounting external to the process vessel. When used with isolation valves, it allows the switch to be isolated from the process (which is helpful during start-up or when system checks or maintenance are scheduled). All series 800 flanged and sealed chambers are offered with 1 inch NPT (F) or socket weld process connections as standard with optional screwed, socket weld, butt weld or flanged connections available.

## Magnetic Level Gauge

### Description

The Magnetic Level Gauge is the instrument to read the level of liquid contained within a vessel.

These types of level Gauges are used for highly hazardous/toxic liquids where gauge glasses are susceptible to attack by the process medium. These gauges can be used for pressures up to 220 bars, temperatures 4000°C and specific gravity at the minimum.

### Working Principle

Magnetic Level Gauges employ two elementary principles:

- i. Archimedes Principle according to which a body immersed in a liquid receives buoyancy equal to the weight of the displaced liquid
  - ii. Principle of attraction among dissimilar poles of permanent magnets and that of repulsion between like poles
- A float containing magnet follows liquid level in the liquid chamber which corresponds to the level of the tank. Position of the float inside the chamber is indicated outside by the hemispherically colored and magnetized balls by 180° rotation and setting into uniform colour along the traverse of the float

### Advantages

The advantages of Magnetic Level Gauge are greater control accuracy, improved reliability, lower installation and start-up expense, less maintenance, eliminated fugitive emissions, and a decreased risk of explosion.

### Application

The Magnetic Level Gauge finds application in:

- Pressure Fuels and Solvents
- Oil Production and Refining
- Lubrication Oils
- Detergents and Soaps
- Boiler Feedwater Tanks
- Fertilisers and Pesticides
- Ammonia Tanks
- Scrubber Tanks/ Storage Tanks
- Acid Tanks

### Target countries

USA, Middle East and other oil producing countries.

### Collaboration Options

Marketing Agreement

### Organisation

Chemtrols Engineering Ltd.

### Specifications

C/c distance	Upto 3 meters in single piece as standard.
Materials	Stainless steel as standard. Other non-magnetic materials on request
Float	Stainless steel, PTFE or PVDF, others on request.
Drain valve	Gate or Ball type
Connections	Flanges as standard; others on request
Isolation valves	Gate or Ball valve
Scale	Stainless steel or Acrylic
Options	Magnetic alarm switches for low/high level Heating or cooling arrangements

Indicating system plastic balls in red and white hemispherically colored and housed in a glass tube. Aluminum balls for high temperatures.

# Material Handling Equipments

## Description

### Drum Lifters

These are material handling equipments to lift, dispense, rack, stack and rotate drums. These equipments are required to move heavy drums and are deployed in places where a forklift would not fit.

These equipments are available with manually operated pump, battery operated hydraulic lift and or totally battery operated for lifting, shifting, stacking, rotating and tilting.

### Hydraulic Elevating Table

These are material handling equipment designed to automatically raise or lower as materials are added or removed from the platform, keeping material at an ergonomic work height.

They are available in different variants with different load carrying capacity.

## Advantages

The Drum Lifters supplied by Mahindra are available in different variants. Key advantages of these Lifters are:

- Safely moves drums on and off high racks
- Stack drums side by side with virtually zero clearance
- Lifts and moves drums easily and efficiently
- Simple to operate

Hydraulic Elevating Table tables increase productivity while reducing potentially harmful bending and twisting motions.

## Application

Drum Lifters are required on shop-floors and warehouses where drums need to organised (lift, dispense, rack, stack and rotate).

Hydraulic Elevating Table tables find application in loading and unloading of dies from presses on shop-floor, removing heavy wheels of presses and loading and unloading of material from trucks/lorries and container stuffing.

## Target countries

Developing countries

## Collaboration Options

Marketing and Sales Agreement.

## Organisation

Mahindra Stiller Auto Trucks Ltd.

## Specifications of Hydraulic Elevating Table

Model 55B	500 Kg	2000Kg	10,000 Kg
Table Size WxL	800x1000x1000 1200x1500x2000	1000x1000x1500 1500x2000x3000	1000x1500 2000x3000
Lift	700x900x1300	900x1200x1800	900x1200
Raised Height H	950x1200x1600	1000x1250x1550	21501550x1850
Lowered Height H	250x300x300	300x350x350x	350x650x650

The details given are for one specific model and select capacity. Similar details are available for other models.

# Material Handling Trucks

## Description

### Hydraulic Pallet Trucks

Pallet Trucks are material handling equipment to move pallets loaded with material within the shopfloor. They have the most sturdy and fail-proof hydraulic system.

These pallet trucks are available in different sizes as per customer requirement. The key features of the truck are:

- Steering: Capable of turning 90 Degree in either direction, for easy handling and maneuverability
- Lift: By hydraulic ram and pump. Handle for pump unit is separate. Steering handle for steering the Pallet Truck gives ease to operation, in any position
- Wheels: Cast Iron or Nylon as required. All wheels provided with shield type Ball bearing for long life
- Chassis: Fabricated M.S. Plate and Channels. Electrically welded for rigid construction, to with stand rough handling
- Available in 50, 65, 75 & 85 mm loading height. Customer to specify, if this loading height is required
- Load carrying wheels of C.I. or Nylon. Polyurethane at extra cost
- Steering wheels of C.I., Rubber Bonded or Nylon.
- Available in capacity 4000 kg, with extended Fork lengths and widths. Fork length available till 3 meters

### Diesel Platform Trucks

These are mobile, power-propelled truck used to carry, push, pull, lift, stack or tier materials. It is an ideal truck to use for the movement of large loads up to 350kg or for use in an order picking operation.

They are invaluable for short-term storage and short-distance, intermittent moves.

## Advantages

The key features of the Hydraulic Pallet Trucks are

- Effortless lifting
- Easy maneuverable steer handles
- Overload relief valves
- Lowering of fork is achieved by feather-touch foot-operated pedals with easy and safe controlled operations

Platform Trucks are economical, durable, require minimum maintenance, have high maneuverability and versatility.

## Application

Hydraulic Pallet Trucks can be used anywhere from a large warehouse heavy-duty usage to small machine shop

Platform trucks find application in places which have complex path, have limited area for movement. It is used primarily in job shops and in-process handling and storage.

## Target countries

Developing countries

## Collaboration Options

Marketing and Sales Agreement

## Organisation

Mahindra Stiller Auto Trucks Ltd.

### Specifications of Hydraulic Pallet Trucks

Capacity:	1-3 Tons
Fork Length:	1000/1200mm
Overall width over Forks:	550mm
Distance Between Forks:	250mm
Lift:	915-1414mm
Lowered height:	85mm
Raised Height:	1000-1500mm
Load Wheel Dia & Face:	80x80mm
Steering Wheel Dia & Face:	200x50mm

### Specifications of Diesel Platform Trucks

- Load carrying capacity: 500-5000 kg
- Crane lifting capacity: 500-2000 kg
- Powered by diesel engine of ample HP
- Aircooled, battery start
- All wheels of solid rubber
- Travel speed : 10-12 km/hr
- Standard automobile controls with Hydraulic brake on rear two wheels
- Leafspring suspension on front & rear wheels
- Boom extension min. 1 m to max. 1.6 m Platform size 1.8x1.2 m is standard. Platform can be made to suit customer requirement also
- Hook height min. 800mm to max. 2.5 m side travel of boom 90 degree either side

## Device for Transmitting Pressure and Differential Pressure Signals

### Description

The pressure-transmitting device consists of deformer, pressure sensing diaphragm, optical fibre, optical source and detector. The deformer consists of two parts movable and fixed. The movable part is attached to the diaphragm, which moves with the pressure change. The other part is attached to the device enclosure and is stationary. Optical fibre is placed in between the two parts of the deformer. The deformer is made up of metal or Perspex.

The differential pressure transmitter consists of two identical units with two optical fibres experiencing micro bending due to variation of the two pressures. The difference in pressure is obtained by optoelectronic processing of the two light signals in the two fibres.

### Advantages

The device is intrinsically safe, as it does not use electricity at the site of measurement. Electricity is required only for the source and in the processing circuit, both of which can be located at a remote place in a safe area. As the transmitted signal is non-electrical (optical), there is no electromagnetic interference (EMI) or radio frequency interference (RFI) during the transmission of the measured signal. It reduces the cost of transmission. The transmission of the signal in the device is possible over a long distance without any repeater or additional booster. Optical fibre has a remarkably low attenuation. The device can be made very small in size and weight and it can measure all ranges of pressure (small, medium and high). The same device can be used for measurement of liquid level or liquid flow rate.

### Applications

The device(s) can be used for measurement of pressure, differential pressure, level of a liquid in a tank, flow of a fluid in a pipeline and its transmission over a long distance. It can be used in hazardous areas such as petroleum industries or underground mines without requiring any flameproof enclosure (FLP).

### Target countries

Developing Countries

### Collaboration Options

Technology Transfer and Consultancy Service

### Organisation

Indian Institute of Technology, Kharagpur