



**ASTIC INSULATION MATERIALS INDUSTRIES L.L.C.**

*Defining Air Solutions.....*

ALFA CONTROL DAMPERS • ACCESS DOORS  
SAND TRAP LOUVER • ALUMINIUM FLASHING





Defining Air Solutions.....

## ALFA CONTROL DAMPERS



ALFA products are manufactured to meet the most stringent specifications and quality standards using our vast experience and expertise in the field.

Automatic intake dampers and manual balancing dampers are available in our range of products for various applications. Energy efficiency, indoor air quality and the fine workmanship are the basis of our engineered products.

### Features of ALFA Control Dampers

- High Performance and Strength.
- Single Skin V locking Blades 18/20 Gauge.
- Axles are bolted to each blade end in order to ensure no slip
- Concealed heavy duty and maintenance free blade linkage
- Opposed blade action for modulating air balancing applications and parallel blades for open /close applications.
- To prevent leakage, blade edges are fitted with synthetic seals as an option.
- Dampers are offered with flange connections or slip driven connections for easy installation.
- Brass bearing as standard.





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## Rectangular Dampers – External Linkage Type

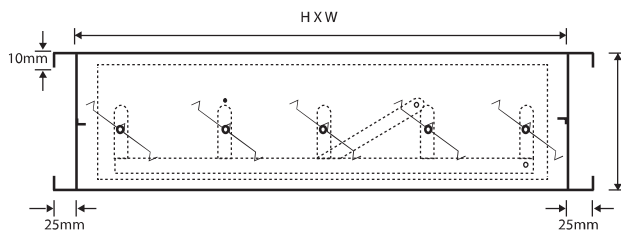


All ALFA single and multisection rectangular volume control dampers are designed for quiet, efficient and reliable air volume control in ventilation system, these ALFA dampers can be manual with locking quadrant or motorised with a different range of electrical actuator readily available.

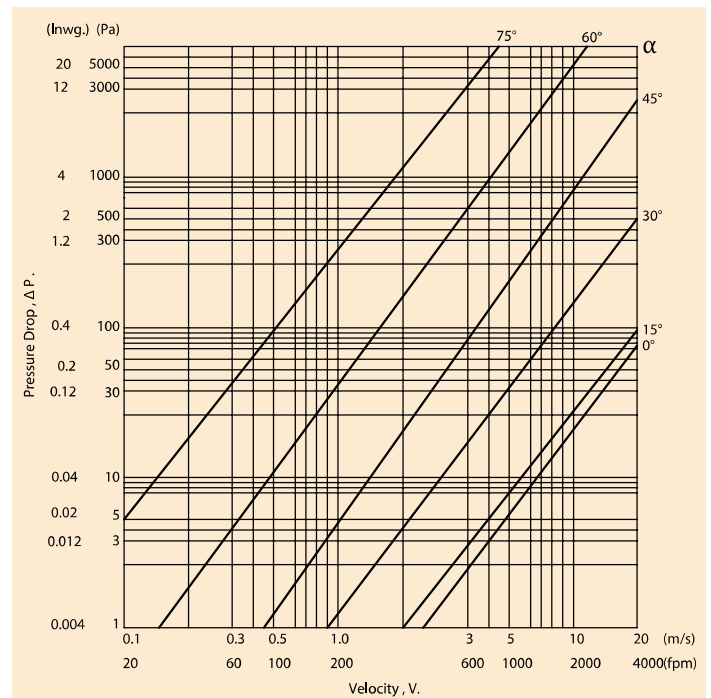
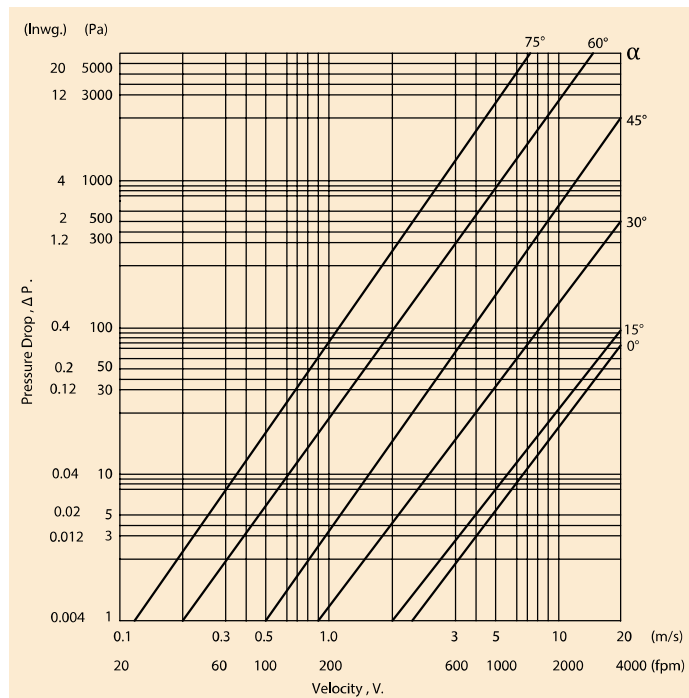
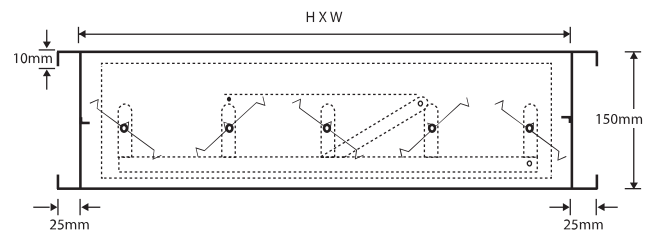


All ALFA rectangular damper blades are of **v lock** type for prevention of noise, blade vibration in high pressure, high velocity and wider duct system.

**Parallel Blade Operation (PB)**



**Opposed Blade Operation (OB)**

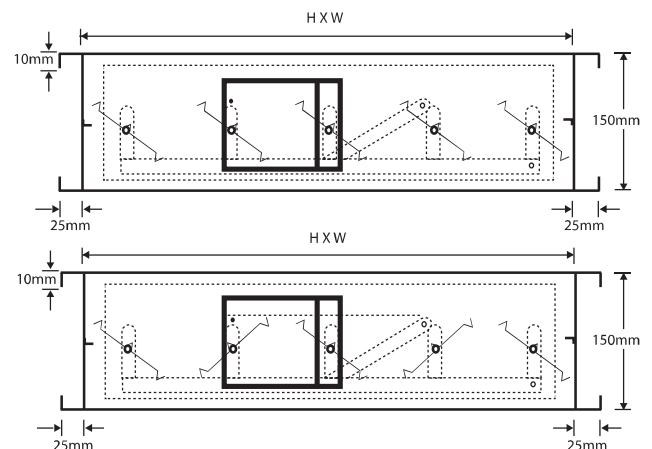


## Motorized Dampers



**Parallel Blade Operation (PB)**

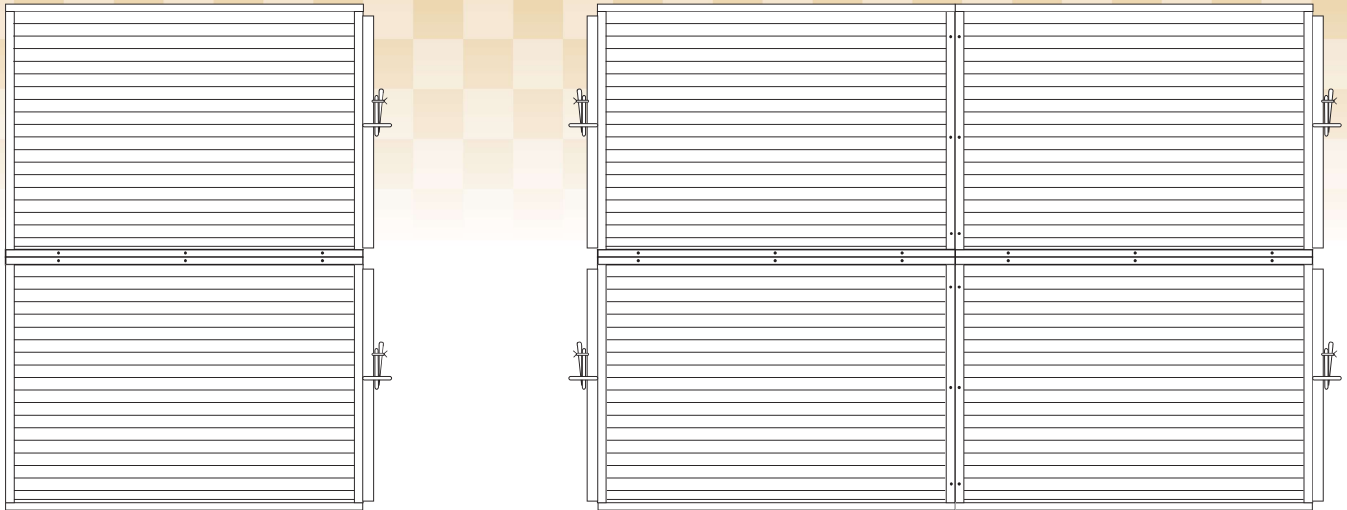
**Opposed Blade Operation (OB)**





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## Multisection Motorized Dampers



## Optional Construction Standard

DETAILS	GI	SS	MS	ALUMINUM
Frame /Body	1.20 mm Galvanized Sheet	1.20 mm SS -304 / SS-316 Sheets	1.50 mm Mild Steel Sheets	1.50 mm Aluminum Sheets
Blade Operation	Parallel Blade	Parallel Blade	Parallel Blade	Parallel Blade
	Opposed Blade	Opposed Blade	Opposed Blade	Opposed Blade
Connection Type	25 mm self flange	25 mm self flange	25 mm self flange	25 mm self flange
	Slip & Deive Cleat connection	Plain end or Box type	Plain end or Box type	Plain end or Box type
	Plain end or Box type			
Additional connection type	20 mm Slip on Flange	20 mm Slip on Flange	30 X 30 X 3 mm MS Angle	30 X 30 X 3 mm Aluminum Angle
	30 mm Slip on Flange	30 X 30 X 3 mm SS 304 Angle	40 X 40 X 4 mm MS Angle	40 X 40 X 4 mm Aluminum Angle
	40 mm Slip on Flange	40 X 40 X 4 mm SS 304 Angle		
Blade Seal	Silicon Blade edge seal	Silicon Blade edge seal	Silicon Blade edge seal	Silicon Blade edge seal
Jamb Seal	0.45 mm thick Galvanized steel jamb seal	0.45 mm thick Stainless steel jamb seal		
Bearing	Brass bearing	Brass bearing SS-304 bearing	Brass bearing	Brass bearing
Linkage	Face Linkage	Face Linkage	Face Linkage	Face Linkage
Additional Coating	Epoxy Coated	Epoxy Coated	Red Oxide Coated	

## Round Volume Control Dampers



- EVCD-200 series Round Volume Dampers are designed with a rigid , robust assembly from formed steel sheet.
- Body is constructed from heavy gauge galvanized steel sheet.
- Self lubricating brass bush of internal square size for smooth blade operation in both static & dynamic conditions.
- Hand locking quadrant is coupled with handle by locking quadrant is marked to show exact open/close position of damper.

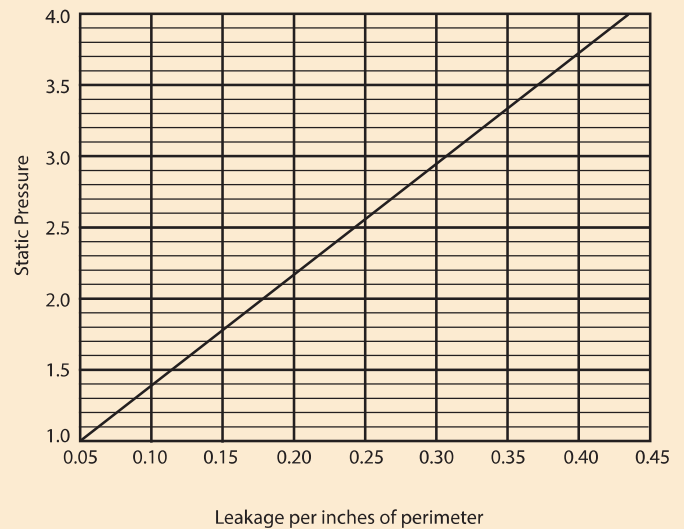
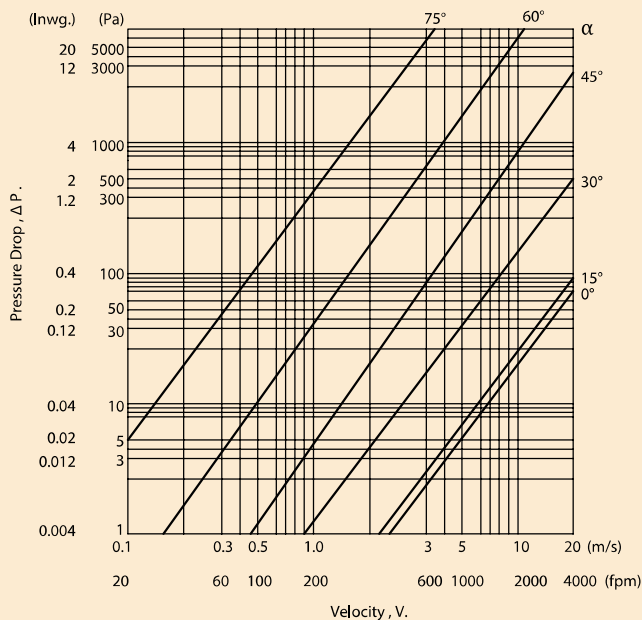
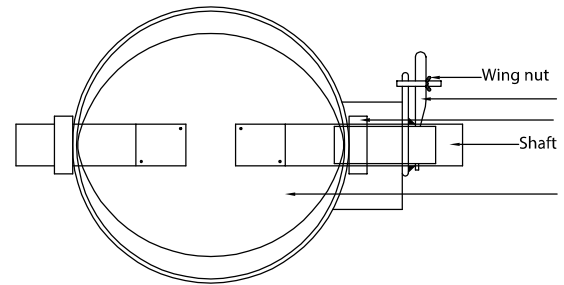
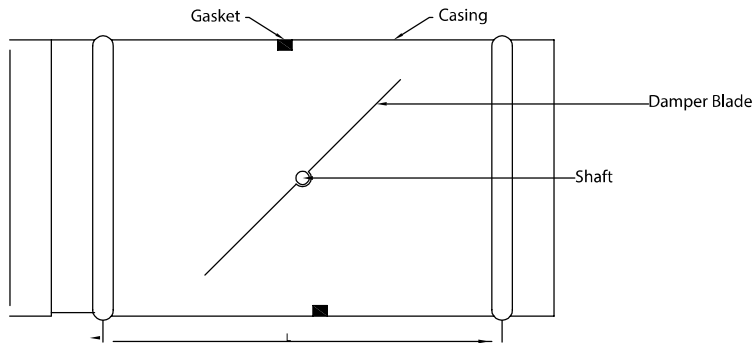




## Constructional Details



- Casing: 0.90mm thickness (20g).Zinc coated formed galvanized steel casing (Body)  
Aluminium and stainless steel casing are available as optional.
- Blade:0.90mm thickness (20g).Zinc coated galvanized steel blade. and stainless steel blades are available as optional.
- Bearing:12mm Dia brass bush
- Shaft:10mm zinc plated galvanized steel round shaft.
- **Quadrant:** Manual operation ,locking type quadrant made of stamped galvanized steel with "Open" and "Close" markings with position locking wing out. • Gasket: Foam gasket to prevent air leakage in shut off position.
- **Temperature Rating:** - 40°C to -100°C(104 F to 212 F)
- **Finish:** Mill Galvanized
- **Minimum Size:** 100 mm Maximum size 400mm. Above 400 mm is multiblade construction as standard. Size of above 400 mm to 800 mm is available and the constructional details shall be provided upon request(optional)
- Actuator Motorized Volume Control, Damper fitted with UL listed Belimo Actuator or equivalent.230V or 24V two position (Open/Close).Actuator without limit switch dampers with extended shaft can be provided to suit the site conditions and to fix the actuator at site modulating (0-10V)actuator is available as option.
- **Connection with duct:** Plain.





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## Alfa Non Return Damper

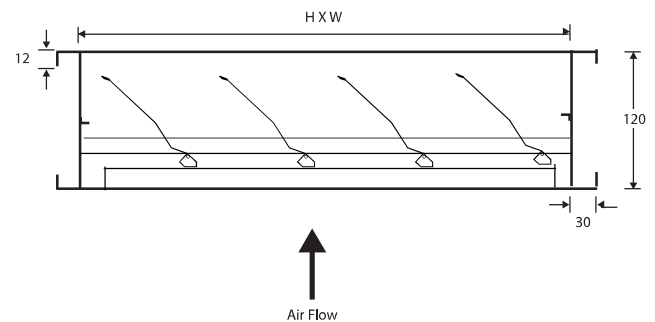
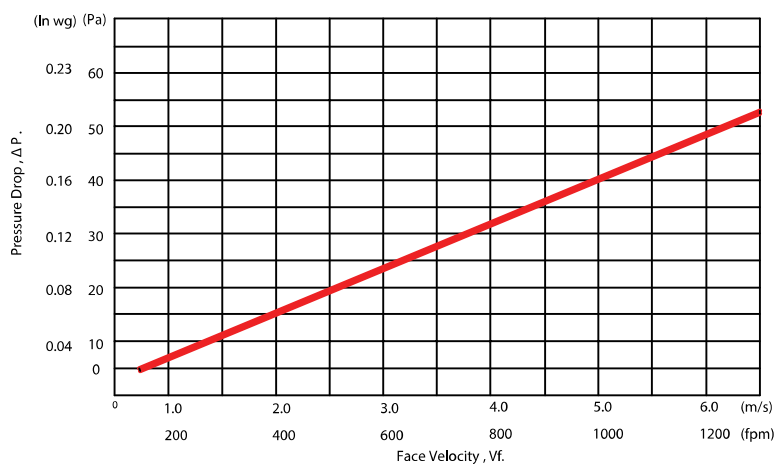


ALFA Non return dampers are designed for automate shut of industrial sections of an air conditioning system, NRD are also called self dampers pressure relief dampers.

The blades are smooth, reliable and designed for energy saving. These are air optional, open and close dampers for intake, discharge and pressure relief vents in an air conditioning system, designed to maintain a constant air pressure level inside pressurized room.

### CONSTRUCTIONAL DETAILS

- **Casing:** 0.90mm thickness (20g).Zinc coated formed galvanized steel casing (Body)  
Aluminium and stainless steel casing are available as optional.
- **Blade:** 0.90mm thickness (20g).Zinc coated galvanized steel blade. and stainless steel blades are available as optional.
- **Bearing:** 12mm Dia brass bush
- **Shaft:** 10mm zinc plated galvanized steel round shaft.



## Installation And Operation

- All the dampers are rigidly constructed, well made and free from any defects in material and workmanship
- Damper has to be stored in a clean and dry environment. A visual check is required on the damper to ensure that no damage is occurred during transit
- Before installation, ensure that the damper is free from dust & foreign matters.
- Check the operation of the damper manually before installation. Ensure that the duct size is appropriate and supported properly so as not to relying on the damper. Damper has to be supported with suitable supporting system.
- All the manual dampers are provided with quadrant with position indicator to show the position of the blades inside the damper.
- Damper position can be manually locked by using the locking wing nut. Usually damper position will be locked during the commissioning of HVAC equipment.

## Maintenance

- A visual check inside the damper is required once per year to ensure that the damper is free from any foreign matters
- Mechanical parts like bearing, spindles and linkages to be checked thoroughly for wearing.
- If the damper is build up with dust, wipe the damper with dry and clean cloth.
- Mechanical (moving) parts can be lightly greased for smooth and noise free functioning of the damper.
- Solution which can affect the zinc coating of the damper should not be used to clean the damper at no event.
- Access doors to be provided for cleaning & maintenance on all the installations.
- In the event of fire flood structural damage or others severe occurrence contract AIMI for specific instructions and recommendations.



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## Access Doors



ALFA Access door's are manufactured to meet the most stringent specification and quality standards using our vast experience and expertise in the field.

### Product Overview

The ALFA range of duct access doors has been designed to allow easy and convenient access to such equipment with HVAC duct work ,while providing a secure , positive seal when closed . The AD -100 and ADH-100 models offers quality double skin construction that meets SMACNA requirements with quick simple installation. ALFA access doors provide easy mounting and positive closure. All models are available in a wide variety of sizes to suit each specific application.

## Features

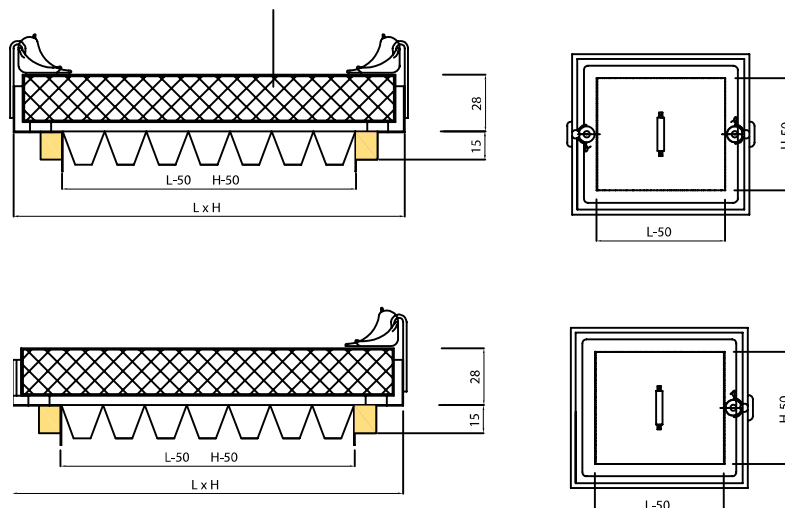
- Progressive action , zinc plated cam locks for secure closure.
- 1" (25mm) thick insulation for reduced noise and heat transfer.2" thick insulation option is also available.
- Synthetic gasket for positive seal.
- Sizes and models to suit most applications. Available in various sizes starting from 6" x 6" through 24" x 24"
- Several easy mounting methods to suit duct type
- Available hinges and safety chains(Optional)

## Models

ADH 100 Hinged with cam lock closure AD 100 Removable ,paired cam locks These access doors meet SMACNA requirements and provide quick ,simple installation whenever duct access is required .Available in various sizes to meet all access requirements. Cam lock operation for positive seal and easy opening.  
Meets SMACNA construction specifications for systems up 2" w.g( 500pa)

## Construction Details

- Double skin 24 Ga, galvanized door panel for extra strength
- 1" (25mm) insulation
- Notched knock -over tabs
- Plated steel cam lock fasteners.
- Positive seal cam lock fasteners
- Safety retaining chain on removable door Model AD 100 AS OPTIONAL ITEM
- Continuous piano type hinges standard in model ADH-100



## Sand Trap Louvres



ALFA Products are manufactured to meet the most stringent specifications and quality standards using our vast experience and expertise in the field.

Sand Trap Louvres are available in our range of products for various applications. Indoor air quality and workmanship are the basis of our engineered products.

### Following are the features of ALFA Sand trap Louvres:

- Excellent performance and heavy duty construction
- Galvanized iron sheet construction (aluminum construction is available as optional)
- Self emptying base provides maintenance free operation

ALFA Series Sand Trap Louvres are designed to reduce the dust loading on main air filter system by separating sand and dust particles from intake air. The frame and blades are made out of heavy gauge Galvanized Steel Sheet/Aluminum sheets. Excellent performance can be achieved at moderate pressure drop and low air velocities. Bird screen, Aluminum media filter, Volume Control Damper & power coated finish shall be provided as an option.



### Models:

- ALFA STL-GI (GI Construction)
- ALFA STL-AL (Aluminum Construction)

Series	Make	Options	Finish
ALFA STL	GI / AL	STL + 25mm filter + VCD	Mill Finish (MF)/ Power Coated (PC)

## Aluminum Flashings



ALFA Products are manufactured to meet the most stringent specifications and quality standards using our vast experience, state-of-the-art factory setup and expertise in the sheet metal fabrication field.

'ALFA' Aluminum flashing in various profiles and sheet thickness are available in our range of products for waterproofing

### Applications.

Aluminum flashings are key components of waterproofing work, which protects the exposed waterproofing membranes from UV (Ultra Violet) rays by reflecting the sunlight & U.V rays. Also, Aluminum Flashing provides mechanical protection to the waterproofing membranes against foot traffic over serviceable roof. It also acts as a shield over the exposed expansion joints by preventing water penetration. Aluminum flashing holds the water proofing membranes from falling down.

- Available with powder coating RAL 7001 (Optional)

### Factory

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JSW is a part of \$4 billion O. P. Jindal Group with interests in mining, carbon steel, power, industrial gases and port facilities. JSW, under the leadership of Mr. Sajjan Jindal, is a \$2 billion company today. Over just a few decades, JSW spread its wings across various sectors as under:

#### JSW Steel Limited

India's 3rd largest steelmaker, JSW Steel Limited consists of the most modern, eco-friendly steel plants with the latest technologies for both upstream and downstream processes with facilities from iron ore mining to production of pre-painted steel.

#### Jindal Praxair Oxygen Co. Ltd.

A joint venture between JVSL and Praxair Inc. USA, JPOCL manufactures oxygen, nitrogen and argon, and has the world's largest air-separation plant.

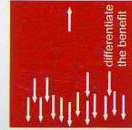
#### JSW Energy Limited

JTPCL is a 2 x 130 MW power plant supplying Power to JVSL and Karnataka state.

#### OUR VALUES



Young thinking is crystal clear  
Openness and transparency above all else. Be it in our transactions, our operations or our interactions with our stakeholders.



Young thinking is unique  
No two problems can benefit from the same solution. It is our job, therefore, to differentiate the benefit of our actions so as to be able to provide our customers and the community at large, superior products.

#### Vijayanagar Mineral Pvt. Ltd.

VMPL is a 4 million ton per annum iron ore mining company situated 25 km from the integrated steel plant, JSW Steel Limited.

#### South West Port Ltd.

Handles 5 million ton per annum of cargo from two 450 meter berths. SWPL helps JSW to import raw materials and export finished Goods.

#### Southern Iron & Steel Company Ltd.

SISCOL is an integrated steel plant manufacturing pig iron, billets, bars and rods for construction and engineering applications.



Young thinking fosters leadership  
Every man is his own master. Every man has the ability to make vital decisions at every level. It is the quality, the speed, the resilience and the coherence with which those decisions are made that determines true leadership.



Young thinking is for winners  
To innovate, to benchmark, to strive and to deliver value beyond expectations.



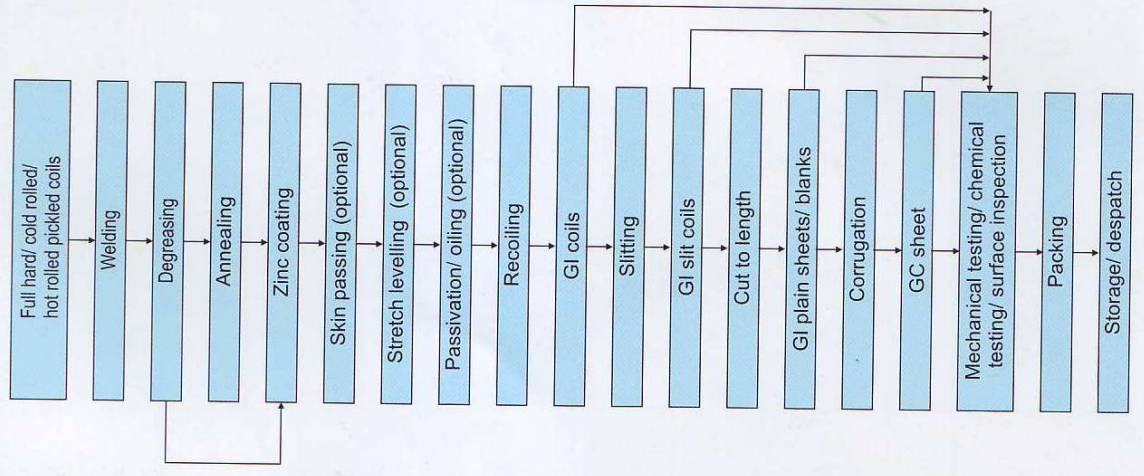


Salient features of JSW Steel's Galvanised lines:

- Widest thickness range from 0.10 to 2.50 mm & width upto 1250 mm.
- Sophisticated moveable auto coating gauge control system supported by X-ray measurement device.
- Fully equipped testing laboratory consisting of Universal Tensile Testing Machine, Vickers & Rockwell Hardness Testing Machine, Erichson Cupping Testing Machine, Salt Spray Testing, Atomic Absorption Spectrometer, Emission Spectrometer, Image Analyser, Alco Meter and Roughness Tester.
- Non reversible on line and off line skin pass mill having thickness range 0.30 - 2.50 mm and width range 760 - 1250 mm.
- Ceramic pot having 165t capacity.
- Digital control system SCADA and logging facility for effective process control.









- White goods
- Auto components
- Lock forming
- HVAC
- Doors, windows
- Insulation & panels
- Structural engineering
- Partition profiles, roll profile forming
- Furniture
- Trunks, drums, barrels, buckets etc.
- Roofing, cladding
- Transformers





**Product range**

**Galvanised coils & plain sheets :**

<b>Thickness</b>	:	0.10 - 2.50 mm (Material $in \leq 0.80$ mm thickness can also be supplied in hard temper)
<b>Thickness tolerance</b>	:	
0.10 - 0.25 mm	:	$\pm 15$ microns (spread of 30 microns)
$> 0.25 - 0.50$ mm	:	$\pm 20$ microns (spread of 40 microns)
$\geq 0.50 - 1.0$ mm	:	$\pm 30$ microns (spread of 60 microns)
$> 1.0$ mm thickness	:	$\pm 2.5\%$ of thickness or 100 microns (whichever is higher)
<b>Width</b>	:	
Full width	:	760 - 1250 mm
Full width tolerance	:	+ 5/ - 0 mm
Slit width	:	50 - 1240 mm
Slit width tolerance	:	+ 0.50/ - 0.50 mm (spread of 1.0 mm)
<b>Length</b>	:	
Length tolerance	:	500 - 4000 mm
Standard sheets	:	+ 10/ - 0 mm (spread of 10 mm)
Blanks	:	$\pm 1$ mm (spread of 2 mm)
<b>Coating</b>	:	90 - 275 gsm
<b>Edge condition</b>	:	Trimmed/ mill edge
<b>Edge condition tolerance</b>	:	
Edge wavy coils	:	4 mm, 3 waves/ meter
Edge wavy sheets	:	5 mm, 2 waves/ meter
Edge camber	:	2 mm max. in 2 mtr/ length
<b>Other tolerances</b>	:	
Buckling	:	5 mm 2 nos. per meter
Bow	:	10 mm max.
Diagonal difference	:	5 mm max.
<b>Temper - 1</b>	:	Soft/ hard
<b>Temper - 2</b>	:	Stretch levelled/ non stretch levelled/ skin passed
<b>Stretch levelling</b>	:	
Skin passed	:	0.23 - 2.50 mm thickness
	:	0.30 - 2.50 mm thickness (soft only)
<b>Surface roughness</b>	:	0.60 - 2.0 microns (after skin passed)
Surface finish	:	Bright/ matte (regular/ small/ big/ suppressed spangles)
Surface treatment	:	Chromated/ un-chromated & oiled
<b>Oiling</b>	:	100 mg/ m <sup>2</sup> to 1000 mg/ m <sup>2</sup> each side
<b>Monogram</b>	:	On line logo can be given
<b>Coil ID</b>	:	508 mm





**Product range**

<b>Coil winding</b>	
For soft coils	: Controlled staggered ( $\pm 10$ mm)/ Straight wound $\geq 0.40$ mm
For hard coils	: Controlled staggered ( $\pm 15$ mm)
<b>Coil weight</b>	
Thickness	: 2.0 - 6.0 t
< 0.25 mm	: 2.0 - 8.5 t
> 0.25 - 0.50	: 5.0 - 22 t
> 0.50 - 2.50	
<b>Packet weight</b>	: 1.50 - 4.50 t (max)
<b>Standards</b>	: IS 277, JIS G 3302, ASTM A653, AS 1397, EN 10142, EN 10147, DIN 17162 and ES C.D7.001
<b>Grades</b>	: Full hard, CQ, D/DD/LFQ & structural
<b>Lock forming quality</b>	: Guaranteed only up to thickness 1.25 mm
<b>Non fluting quality</b>	: As per specification 2" mandrel thick > 0.35 mm 3" mandrel thick > 0.30 to $\leq 0.35$ mm 5" mandrel thick $\leq 0.30$ mm
<b>Hardness</b>	
Hard	: 90 ( $\pm 5$ HRB) (up to 0.80 mm)
Soft	: 60 ( $\pm 5$ HRB) (0.23 - 2.50 mm)
<b>Identification &amp; marking</b>	: Bar code sticker/ metal sticker

**Product range**

<b>Galvanised corrugated sheets</b>	
<b>Thickness</b>	: 0.10 - 0.80 mm
<b>Width</b>	: 665/ 720/ 740/ 760/ 780/ 800/ 875/ 1065 mm
<b>Length</b>	: 1829 - 4877 mm (Max corrugation length of 4877 mm can be supplied in thickness 0.22 - 0.65 mm)
<b>Temper - 1</b>	: Hard/ soft
<b>Temper - 2</b>	: Stretch levelled/ non stretch levelled
<b>Stretch levelling</b>	: 0.60 - 0.80 mm thick (soft)
<b>Non stretch levelling</b>	: 0.10 - 0.75 mm thick (hard)
<b>Surface finish</b>	: Regular/ small and big spangles
<b>Zinc coating</b>	: 90 - 275 gsm
<b>Packet weight</b>	: 1 - 4.5 t (max)
<b>Corrugation</b>	: As per specification
<b>Specification</b>	: IS 277, JIS G 3316, Ethiopian ES C.D7.001, or equivalent.
<b>Grade</b>	: Roofing (full hard)
<b>Hardness</b>	: 90 ( $\pm 5$ HRB) (up to 0.75 mm) hard 60 ( $\pm 5$ HRB) (0.60 - 0.80 mm) soft
<b>Identification &amp; marking</b>	: Bar code sticker/ metal sticker

Note : Dimensional tolerances same as galvanised plain sheets.

**Product classification at a glance**

Parameters	Hard	Soft commercial quality
Thickness <sup>a</sup>	0.10 - 0.80 mm (conditional) <sup>b</sup>	0.23 - 2.50 mm (conditional) <sup>c</sup>
Width (coils)	760 - 1250 mm (conditional) Slit width 50 - 1240 mm	760 - 1250 mm (conditional) Slit width 50 - 1240 mm
Surface quality	Regular/ small/ big spangles Chromated	Regular/ small/ big spangles Chromated/ dry / oiled
Oiling	-	100 - 1000 mg/m <sup>2</sup> each side
Surface roughness	Non stretch levelled	Stretch levelled/ non stretch levelled
Coll ID	508 mm	508 mm
Coil weight	2.0 - 8.5 t max (conditional)	2 - 22 t max (conditional)
Packet weight	1 - 4.5 t max	1 - 4.5 t max
Edge condition	Trimmed/ mill edge	Trimmed/ mill edge
Zinc coating (gsm)	100 - 180 gsm ( $\leq 0.18$ mm) 100 - 220 gsm (0.30 - 0.35 mm) 100 - 275 gsm ( $> 0.35 - 0.60$ mm) 100 - 220 gsm ( $> 0.60$ mm)	100 - 180 gsm ( $> 0.20 - 0.30$ mm) 90 - 220 gsm ( $> 0.30 - 0.40$ mm) 90 - 275 gsm ( $> 0.40$ mm)
Length for sheets	1829 - 4877 mm (conditional) <sup>f</sup>	1000 - 4000 mm (conditional)
L.F.O (up to 1.25 mm)	-	Yes
Mechanical properties	Refer - GC-J1 to J4 & GP-J6, J9	Refer - GP-J1 to GP-J9
Hardness (HRB)	Min 85 HRB	55 - 65 HRB
Specification	IS-277, JIS G 3316, JIS G 3302 SSGH, ES C.D7.026, ES C.D7.001	IS-277, JIS G 3302 SGCC, EN 10142, DIN 17162 St.02Z & ASTM A 653 CS A, B, C

- a - Thickness mentioned is minimum base metal thickness.
- b - For thickness 0.10 to < 0.25 mm thick, material will be supplied in maximum width of 1000 mm.
- c - For thickness > 0.25 to 0.50 mm thick, material will be supplied in maximum width of 1000 mm.
- d - % elongation for thickness less than 0.30 mm will be minimum 16% at 80 GL.
- e - ASTM A 653 SS grade 80 will be supplied in non-skin pass condition.
- f - Corrugation length of 4267 mm and above can be supplied only in thickness 0.22 - 0.65 mm.

**Product classification at a glance**

Soft drawing quality	Soft skin pass quality	Structural quality
0.50 - 1.20 mm	0.30 - 2.0 mm	0.30 - 2.50 mm (conditional) <sup>c</sup>
900 - 1250 mm (conditional) Slit width 50 - 1240 mm	900 - 1250 mm (conditional) Slit width 50 - 1240 mm	760 - 1250 mm (conditional) Slit width 50 - 1240 mm
Regular/ small/ big spangles Chromated	Suppressed Chromated/ dry / oiled	Regular/ small/ big spangles/ suppressed Chromated/ dry / oiled
Stretch levelled	100 - 1000 mg/m <sup>2</sup> each side Stretch levelled & skin pass	100 - 1000 mg/m <sup>2</sup> each side Stretch levelled/ skin pass
-	0.60 - 2.00 microns (after skin pass)	0.60 - 2.00 microns (after skin pass)
508 mm	508 mm	508 mm
2 - 22 t max (conditional) 1 - 4.5 t max	2 - 22 t max (conditional) 1 - 2.5 t max	5 - 22 t max (conditional) 1 - 4.5 t max
Trimmed/ mill edge	Trimmed/ mill edge	Trimmed/ mill edge
100 - 275 gsm ( $> 0.40$ mm)	90 - 220 gsm ( $> 0.30 - 0.40$ mm) 90 - 275 gsm ( $> 0.40$ mm)	90 - 220 gsm ( $> 0.30 - 0.40$ mm) 90 - 275 gsm ( $> 0.40$ mm)
-	-	-
-	-	-
1000 - 4000 mm (conditional)	1000 - 4000 mm (conditional)	1000 - 4000 mm (conditional)
Yes	Yes	-
Refer - GP-J1 to GP-J9	Refer - GP-J1 to GP-J9	Refer - GP-J1 to GP-J9
50 - 65 HRB	55 - 85 HRB	As per specification
IS-277, JIS G 3302 CD1, DIN 17162 St.03Z, ASTM A 653 FS A, B & AS 1397	IS-277, JIS G 3302 SGCC, EN 10142 & ASTM A 653 CS A, B, C, SS grades	JIS G 3302 SGC grades, EN 10147 grades, ASTM A 653 SS grades & AS 1397



**Packing**

Description	Wax paper (optional)	HDFE paper laminated VCI	Cardboard ID & OD	GP sheet Cover	HR ID ring	GP OD ring	Wooden pallet	Steel strap & seal (3/4")	Steel strap & seal (7/4")

**Coils**

Sea worthy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Metallic		Yes		Yes	Yes	Yes		Yes
Non metallic		Yes			Yes	Yes		Yes

**Sheet packets**

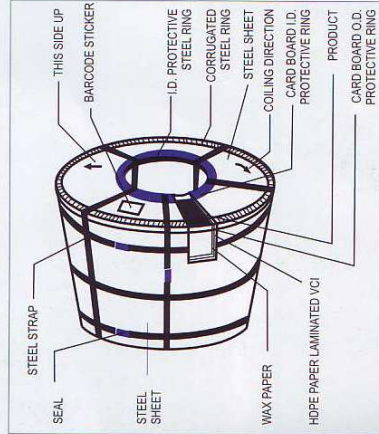
Sea worthy		Yes		Yes		Yes	Yes	Yes
Metallic		Yes		Yes		Yes	Yes	Yes
Non metallic		Yes				Yes	Yes	Yes

**Identification & marking**

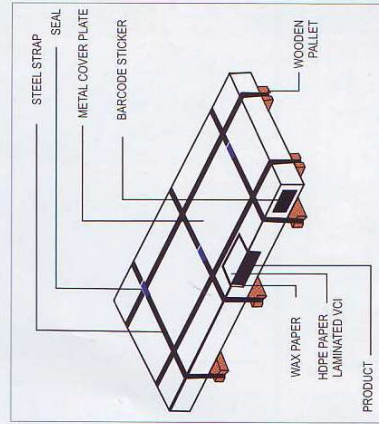
Bar code and printed paper sticker containing details of manufacturer name, customer name, coil number, grade, size, length of coil, number of sheets and net & gross weight.



**SEA WORTHY COIL PACKING**



**SEA WORTHY SHEET PACKING**





**Chemical composition (product analysis)**

(values in %)

Steel grade designation	C (max)	Mn (max)	P (max)	S (max)	Si (max)	Al (min)	Nb (max)	V <sup>a</sup> (max)	Ti (max)	Nitrogen (max)
<b>CS</b>										
CS type A	0.10	0.60	0.030	0.035	-	0.02	0.06	0.008	0.30	90 PPM
CS type B	0.02-0.15	0.60	0.030	0.035	-	0.02	0.06	0.008	0.30	90 PPM
CS type C	0.08	0.60	0.100	0.035	-	0.02	0.06	0.008	0.30	90 PPM
<b>FS</b>										
FS type A	0.10	0.50	0.020	0.035	-	0.02	0.06	0.008	0.30	90 PPM
FS type B	0.02-0.10	0.50	0.020	0.030	-	0.02	0.06	0.008	0.30	90 PPM
<b>SS</b>										
SS grade 33 (230)	0.20	-	0.040	0.04	-	0.02	0.06	0.008	0.30	90 PPM
SS grade 37 (255)	0.20	-	0.100	0.04	-	0.02	0.06	0.008	0.30	90 PPM
SS grade 40 (275)	0.25	-	0.100	0.04	-	0.02	0.06	0.008	0.30	90 PPM
SS grade 50 (340) class 1 and 2	0.25	-	0.200	0.04	-	0.02	0.06	0.008	0.30	90 PPM
SS grade 80 (650)	0.20	-	0.040	0.04	-	0.02	0.06	0.008	0.30	90 PPM
<b>HSLAS type A</b>										
HSLAS grade 40 (275)	0.20	1.20	-	0.035	-	0.02	0.06	0.008	0.30	90 PPM
HSLAS grade 50 (340)	0.20	1.20	-	0.035	-	0.02	0.06	0.008	0.30	90 PPM
HSLAS grade 60 (410)	0.20	1.35	-	0.035	-	0.02	0.06	0.008	0.30	90 PPM
<b>HSLAS type B</b>										
HSLAS grade 40 (275)	0.15	1.20	-	0.035	-	0.02	0.06	0.008	0.30	90 PPM
HSLAS grade 50 (340)	0.15	1.20	-	0.035	-	0.02	0.06	0.008	0.30	90 PPM
HSLAS grade 60 (410)	0.15	1.20	-	0.035	-	0.02	0.06	0.008	0.30	90 PPM

The sum of copper, nickel, chromium and molybdenum shall not exceed 0.50% on heat analysis and individual limits of Cu-0.20, Ni-0.20, Cr-0.15 and Mo-0.008% max.

For steel having a carbon content of 0.02% or less, the limit for columbium is 0.045% maximum.  
a - The limits do not apply when HSLAS is specified.

**Dimensions tolerances**

(UOM - mm)

Nominal thickness	At 10 mm distance from edge		At 25 mm distance from edge		Out of squareness tol.
	≤ 1250	± 0.08	≤ 1250	± 0.05	
≤ 0.40	± 0.10	± 0.05	± 0.10	± 0.05	1% of width (max)
> 0.40 ≤ 1.00	± 0.13	± 0.05	± 0.13	± 0.05	
> 1.00 ≤ 1.50	± 0.15	± 0.05	± 0.15	± 0.05	
> 1.50 ≤ 2.00	± 0.20	± 0.05	± 0.20	± 0.05	







Technical delivery conditions : GP-J1

Reference specification : ASTM A 653/A 653M - 2003 (Commercial, lock forming and structural qualities)

Width	300 - 600	> 600 - 1200	> 1200 - 1250
Tolerances	+3/-0	+5/-0	+6/-0
Length	300 - 1500	> 1500 - 3000	> 3000 - 4877
Tolerances	+6/-0	+20/-0	+35/-0

Mechanical properties<sup>a</sup>

Designation	Type	Grade	Yield strength min (mpa)	Tensile strength min (mpa) <sup>b</sup>	% Elongation at 50 GL min. <sup>c</sup>	Application
CS <sup>a</sup>	Type A	-	170 - 380	-	20	Commercial steel
	Type B	-	205 - 380	-	20	
	Type C	-	170 - 410	-	15	
FS <sup>a</sup>	Type A & B	-	170 - 310	-	26	Forming steel
		33 (230)	230	310	20	
SS		37 (255)	255	360	18	Structural steel
		40 (275)	275	380	16	
		50 (340) class 1	340	450	12	
		50 (340) class 2	340	-	12	
		80 (550) b	550	570	-	
		40 (275)	275	340	22	
HSLAS <sup>d</sup>	Type A	50 (340)	340	410	20	High strength low alloy steel
		60 (410)	410	480	16	
		40 (275)	275	340	24	
HSLAS <sup>d</sup>	Type B	50 (340)	340	410	22	High strength low alloy steel
		60 (410)	410	480	18	

<sup>a</sup> Sample should be cut from the product longitudinal to the rolling direction.

- a - The typical mechanical property values presented here are non mandatory.
- b - For thickness 0.71 mm or thinner, no tension test is required if the hardness result in Rockwell B 85 or higher.
- c - Where an ellipsis (-) appears in this table, there is no requirement, but the analysis shall be reported.
- d - HSLAS grades will be supplied for 1.20 mm & above thickness only.



Technical delivery conditions : GP-J1

Reference specification : ASTM A 653/A 653M - 2003 (Commercial, lock forming and structural qualities)

Bend test

Coating grade	Angle of bend	Material grade CS, FS for different thickness in mm				Material grade SS <sup>a</sup>			
		≤ 1.00	> 1.00 - ≤ 2.00	> 2.00	> 2.00	230	255	275	275
Z90	180°	0t	0t	0t	1.5t	2t	2.5t	1.5t	2t
Z120	180°	0t	0t	0t	1.5t	2t	2.5t	1.5t	2t
Z180	180°	0t	0t	0t	1.5t	2t	2.5t	1.5t	2t
Z275	180°	0t	0t	1t	1.5t	2t	2.5t	1.5t	2t

Coating grade	Angle of bend	HSLAS type A <sup>a</sup>				HSLAS type B			
		275	340	410	480	275	340	410	480
Z90	180°	1.5t	1.5t	3t	1t	1t	1t	1.5t	1.5t
Z120	180°	1.5t	1.5t	3t	1t	1t	1t	1.5t	1.5t
Z180	180°	1.5t	1.5t	3t	1t	1t	1t	1.5t	1.5t
Z275	180°	1.5t	1.5t	3t	1t	1t	1t	1.5t	1.5t

a - SS grade 340 and 550 and HSLAS type A grades 480 and 550 are not subjected to bend test requirements.

t - Product thickness.

Mass of coating<sup>a</sup>

Grade of coating	Grade of coating (Si)	Minimum average coating mass in triple spot test	Minimum coating mass in single spot test <sup>*</sup>
G30	Z90	90	75
G40	Z120	120	90
G60	Z180	180	150
G80	Z275	275	235

<sup>\*</sup> Minimum individual value obtained in triple spot test.

a - Total mass including both surfaces.

Additional requirements

- Coils and sheets shall be supplied in regular spangles, small spangles and suppressed spangles.
- Sheets for other sizes (thickness, width and length) may also be supplied subjected to the mutual agreement between the purchaser and the manufacturer.
- The thickness of coils/ sheets shall be expressed as final thickness after galvanising in millimeters and this shall be regarded as the nominal thickness.
- Microalloying element addition is optional at JSW Steel Limited's discretion or as per mutual agreement.