

PRODUCT CATALOGUE

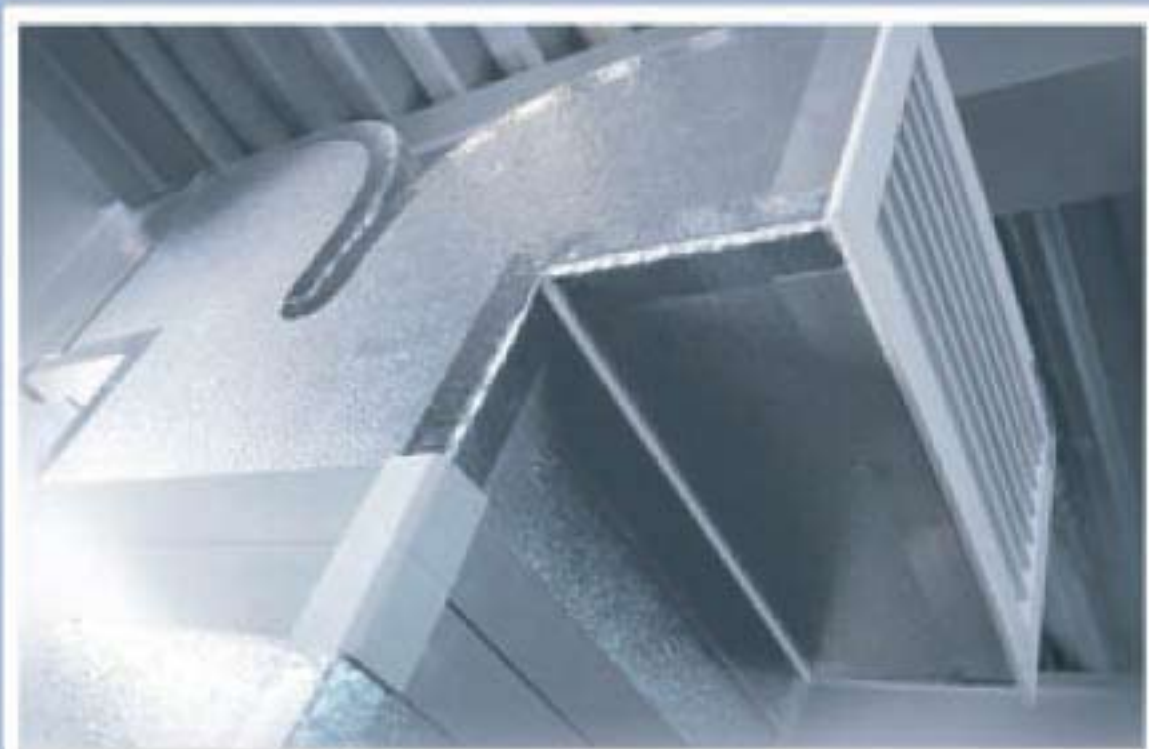


**$\pi$ Pal** PRE-INSULATED DUCTING SYSTEM

A PAL TECHNOLOGY

PAL SYSTEM INTERNATIONAL  
PO BOX 113826, DUBAI - U.A.E.  
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The Heating, Ventilation and Air Conditioning (HVAC) industry is in the midst of a dynamic era. However, air sheet metal ducting, a critical component of HVAC systems, has remained virtually unchanged since the early 1900's. Several factors and recent innovations have introduced the need to revolutionize air ducting. Building materials and insulating products have dramatically improved. Requirements for clean air are becoming increasingly stringent. Energy costs have continued to escalate. Changing fire and smoke codes have raised the standards for compliance.



## INTRODUCTION

Pal International has been the pioneer in pre-insulated foam ducting. Pal was the first company in the world to introduce the innovative and revolutionary foam based pre-insulated ductwork as an alternative to sheet metal ductwork. It was invented by Claudio Ferraro of Bologna Italy in 1965.

Pal has proven the value of its product and has been the top brand for air conditioning ductwork widely used in most prestigious projects worldwide due to its known advantages over the traditional galvanized ductwork.

Pal has commissioned state of the art manufacturing plants and established workshops in different regions worldwide and also provide specialized and comprehensive training programs conducted by service oriented and experienced trainers well-equipped with the latest technologies to ensure quality of ducting fabrications and installations. It is closely supervised by the representatives from subsidiary companies and sales offices worldwide.



### THE "PAL TECHNOLOGY" OFFERS:

- Complete line of components and accessories
- Professional hand tools and automatic machinery
- Specialized training programs for duct manufacturers
- "Duct Design Software" to size the duct system and estimate the material needed
- Technical Support

### ADVANTAGES OF PAL DUCTWORK:

- Cleanable and hygienic,
- Environmentally Friendly, CFC, HCFC free
- Clean Air: Contains no microfibres
- Light Weight: Only 15% of sheet metal ducting
- Resistance to fungus growth
- Space Saving: Flush fitting installation possible
- Low Leakage: Fully sealed systems conforms to DW 144 Class C-high pressure
- Low "U" value
- Energy Savings: Up to 20% annually
- Fast-Track Installation: Rapid erection combined with single fix installation
- Site fabrication capability
- No limits to duct sizes
- High-Compressive Strength
- High rigidity / integrity
- Base material is impermeable to moisture, insoluble



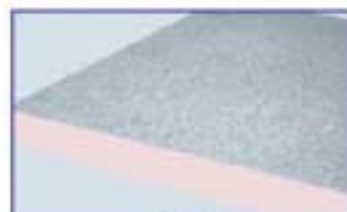
## PAL PANELS



**PAL "PIR" Polyisocyanurate Foam Panel** 45/50 kg/m<sup>3</sup> density, 20mm/30mm thickness, CFC/HCFC free and protected on both sides with 80 or 200 microns aluminum facing. The embossed aluminum foil is lacquered with 3gm/m<sup>2</sup> of corrosion resistant polysar varnish.

### ART P 80 Internal Use

Thickness	20mm / 30mm
Density	45 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm × 1200mm
Thermal Conductivity	0.020 W/Mk
Aluminum Foil	80 microns both sides
Aluminum Finish	Embossed / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



20 P80



30 P80

### ART P 200 External Use

Thickness	20mm / 30mm
Density	50 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm × 1200mm
Thermal Conductivity	0.020 W/Mk
Aluminum Foil	80/200 microns both sides
Aluminum Finish	Embossed / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



20 P200



30 P200

### PAL 100 Internal Use

Thickness	20mm
Density	50 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm × 1200mm
Thermal Conductivity	0.020 W/mK
Aluminum Foil	80 microns both sides
Aluminum Finish	Embossed / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



PAL 100

### ART 10 P80 Internal Use

Thickness	10mm
Density	50 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm × 1200mm
Thermal Conductivity	0.0272 W/mK
Aluminum Foil	80 microns both sides
Aluminum Finish	Embossed / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



10 P80

### ART PSS 80 Smooth Facing PIR Panel

Thickness	20mm
Density	45 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm × 1200mm
Thermal Conductivity	0.020 W/mK
Aluminum Foil	80 microns both sides
Aluminum Finish	Smooth / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



20 PSS80

## PAL PANELS



**PAL "PUR" Polyurethane Foam Panel** 45/50 kg/m<sup>3</sup> density, 20mm/30mm thickness, CFC/HCFC Free and protected on both sides with 80 or 200 microns aluminum facing. The embossed aluminum foil is lacquered with 3gm/m<sup>2</sup> of corrosion resistant polymer varnish.

### ART PU 80

#### Internal Use

Thickness	20mm / 30mm
Density	45 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm x 1200mm
Thermal Conductivity	0.020 W/Mk
Aluminum Foil	80 microns both sides
Aluminum Finish	Embossed / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



20 PU80



30 PU80

### ART PU 200

#### External Use

Thickness	20mm / 30mm
Density	50 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm x 1200mm
Thermal Conductivity	0.020 W/Mk
Aluminum Foil	80/200 microns both sides
Aluminum Finish	Embossed / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



20 PU200



30 PU200

### ART PUSS 80

#### Smooth Facing PUR Panel

Thickness	20mm
Density	45 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm x 1200mm
Thermal Conductivity	0.020 W/Mk
Aluminum Foil	80 microns both sides
Aluminum Finish	Smooth / Embossed
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84

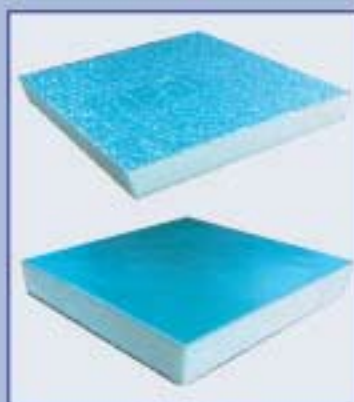


20 PUSS80

**PAL Eco Panel** is a pre-insulated panel with 45kg/m<sup>3</sup> density, 20mm thickness, smooth / embossed aluminum finishing, both sides are antimicrobial coated.

### ART ES 80

Thickness	20mm
Density	45 kg/m <sup>3</sup> ± 3%
Panel Diameter	4000mm x 1200mm
Thermal Conductivity	0.020 W/Mk
Aluminum Foil	80 microns both sides
Aluminum Finish	Smooth/ Embossed
Antimicrobial and Antibacterial Reaction	ASTM G21 ASTM G22 ASTM E2180
Fire and Smoke Classification	Class "O" BS 476 Part 6 & 7 Class "A" ASTM E84



20 ES80

## PAL PANEL ACCESSORIES

### ART AC 10

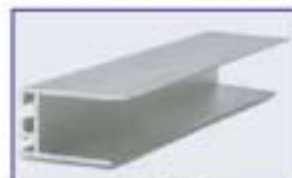
Polymer / Aluminum Invisible Profile  
Aluminum Joint Profile

Thickness 20mm, 30mm

Code 20 AC 10

30 AC 10

Length 4 mt.



20 AC10



30 AC10

### ART ES 10

Pal Eco System Green Color Polymer Invisible Profile

Thickness 20mm

Code 20 ES 10

Length 4 mt.



20 ES10

### ART AC 11

H Bayonet in Polymer  
Aluminum Channel

Thickness 20mm, 30mm

Code 20 AC 11

30 AC 11

Length 4 mtr



20 AC11



30 AC11

### ART AC 12

Corner Cover in Polymer  
Steel Corner

Code 20 AC 12

30 AC 12



20 AC12



30 AC12

### ART ES 12

Pal Eco System Green Color Cover in Polymer

Code 20 ES 12



20 ES12



## PAL PANEL ACCESSORIES



### ART AC 13

#### Corner Plate for Invisible Profile

Thickness 20mm, 30mm  
Code 20 AC 13  
30 AC 13



20 AC13



30 AC13

### ART AC 14

#### Aluminum U Profile

Length 4 mtr  
Thickness 20mm, 30mm  
Code 20 AC 14  
30 AC 14



20 AC14



30 AC14

### ART ES 14

#### Pal Eco System Green Aluminum U Profile

Length 4 mtr  
Thickness 20mm  
Code 20 ES 14

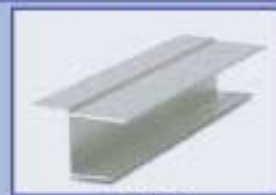


20 ES14

### ART AC 15

#### Aluminum Chair Profile

Length 4 mtr  
Thickness 20mm, 30mm  
Code 20 AC 15  
30 AC 15



20 AC15

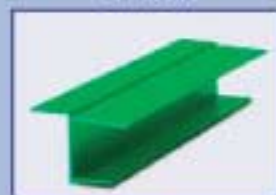


30 AC15

### ART ES 15

#### Pal Eco System Green Aluminum Chair Profile

Length 4 mtr  
Thickness 20mm  
Code 20 ES 15



20 ES15

## PAL PANEL ACCESSORIES



### ART AC 16

#### Aluminum F Profile

Thickness 20mm, 30mm  
Code 20 AC 16  
30 AC 16



20 AC16

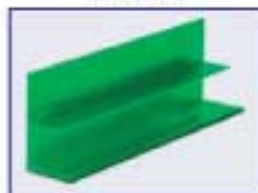


30 AC16

### ART ES 16

#### Pal Eco System Green Aluminum F Profile

Length 4 mtr  
Thickness 20mm  
Code 20 ES 16



20 ES16

### ART AC 18

#### Reinforcement Bar in Aluminum

Length 4 mtr  
Thickness 14mm  
Code AC 18



AC 18

### ART AC 19

#### Reinforcement Bar in Aluminum / Polymer

Code AC 19



AC 19

### ART AC 20

#### Duct Support

Code AC 20



AC 20

### ART AC 21

#### Tiger Connector

Code AC 21



AC 21

### ART AC 22

#### Tiger Closure

Code AC 22



AC 22

## PAL PANEL ACCESSORIES



### ART AC 19A Cross Fixing Device

Code AC 19A



AC 19A

### DTCM 02 Screw for Stiffening Rod

Code DTCM 02



DTCM 02

## ADHESIVE MATERIAL

### ART M 23 PAL Adhesive

Capacity 15 kg / Tin  
Code M 23



M 23

### ART M 24 Aluminum Tape

Width 50mm for 20mm Panel  
Width 75mm for 30mm Panel  
Code 20 M 24  
30 M 24



20 M 24



30 M 24

### ART M 25 PAL Sealant

Code M 25



M 25

### ART M 30 Gasket Self Adhesive

Code M 30



M 30

### ART VCD

#### Pre-insulated Volume Control Damper

Thickness 20mm, 30mm  
Code VCD



### ART DAC

#### Pre-insulated Access Door

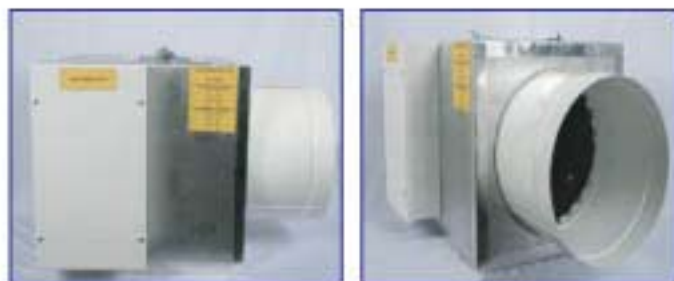
Thickness 20mm, 30mm  
Code DAC



### ART PVAV

#### Pre-insulated VAV - Bypass

Thickness 20mm, 30mm  
Code PVAV



### ART MVCD

#### Pre-insulated Motorized VCD

Thickness 20mm, 30mm  
Code MVCD



A complete set of professional hand tools and manual fabrication equipment have been specifically developed to enable efficient and economical fabrication of ductwork. Ease of portability provides the option for site base manufacturing.

A full line of automatic machinery is also available for high volume ductwork requirement.



**ART EM 27**  
**Portable Fabrication Table**

Size            4 mtr x 1.2 mtr  
Code            EM 27



**ART EM 28**  
**ART EM 29**  
**Aluminum Clumping Ruler**

Length        4 mtr  
                  1.2 mtr  
Code         EM 28  
                  EM 29



**ART EM 30**  
**ART EM 31**  
**Square in Aluminum**

Size            1200 mtr  
                  700 mm  
Code         EM 30  
                  EM 31



## MANUAL FABRICATION EQUIPMENT



### ART EM 32 Compass

Code EM32



### ART EM 33 Manual Bending Machine

Code EM 33



### ART EM 24 PAL Manual Fabrication Tool Kit

- 45° Left Cutter
- 45° Right Cutter
- 90° Straight Cutter
- 45° Double Blade Cutter – 20mm
- Compass
- Glue Spreader – Manual
- Stiff Spatula – Aluminium
- Manual Silicon Gun
- Measuring Tape
- Rivet Machine
- Rubber Hammer
- Knife
- Tape Marker



### ART EM 35 Pneumatic Glue Spreader

Code EM 35



### ART EM 36 Pneumatic Extended Silicon Tool

Code EM 36



### ART EM 37 Aluminum Profile Cutting Machine

Code EM 37



**SPARE TOOLS****ART ST 42  
ART ST 43  
Double Blade Cutter**

Size 20mm, 30mm  
45° Double Blade  
Code ST 42 (20mm)  
ST 42 (30mm)

**ART ST 44  
ART ST 45  
ART ST 46  
Single Blade Cutter**

Size 20mm, 30mm  
90° Straight  
45° Left  
45° Right  
Code ST 44 (90° Straight)  
ST 45 (45° Left)  
ST 46 (45° Right)

**ART ST 47  
Marker**

Code ST 47

**ART ST 48  
Stiff Spatula**

Code ST 48

**ART ST 49  
Glue Spreader Manual**

Code ST 49

**ART ST 50  
Tape Marker**

Code ST 50

**DTCM 12  
Rubber Hammer**

Code DTCM 12



**ART EA 38**  
**Straight Cutting Automatic Machine**

Code EA 38



**ART EA 39**  
**Electric Bending Machine**

Code EA 39



**ART EA 40**  
**Computer Cutting Machine 3 in 1**

Code EA 40



**ART EA 41**  
**Plotter Machine**

Code EA 41





## ORDER GUIDE

### 20mm PANEL (INTERNAL USE)

To produce 1,000m<sup>2</sup> of PAL Pre-insulated Ducting System, the following is a list of material and accessories for a standard construction requirement:

CODE	DESCRIPTION	UOM	APPROX. QTY.
20P80	Panel 4000 x 1200mm	m <sup>2</sup>	1,000
20AC10	Aluminum Invisible Profile	mtr	760
20AC11	H Bayonet in Polymer	mtr	400
20AC12	Corner Cover in Polymer	pc	900
20AC13	Corner Plate for Invisible Profile	pc	1,200
20AC14	Aluminum U Profile	mtr	80
20AC15	Aluminum Chair Profile	mtr	80
20AC16	Aluminum F Profile	mtr	80
M23	PAL Adhesive	kg	90
20M24	Aluminum Tape	roll	150
M25	PAL Sealant	tube	90

### 30mm PANEL (EXTERNAL USE)

To produce 1,000m<sup>2</sup> of PAL Pre-insulated Ducting System, the following is a list of material and accessories for a standard construction requirement:

CODE	DESCRIPTION	UOM	APPROX. QTY.
30P200	Panel 4000 x 1200mm	m <sup>2</sup>	1,000
30AC10	Aluminum Joint Profile	mt	760
30AC11	Aluminum Channel	mt	400
30AC12	Corner Plate for Invisible Profile	pc	1,500
30AC13	Steel Corner	pc	1,500
M30	Gasket	pc	400
30AC14	Aluminum U Profile	mt	80
30AC15	Aluminum Chair Profile	mt	80
30AC16	Aluminum F Profile	mt	80
M23	PAL Adhesive	kg	90
30M24	Aluminum Tape	roll	150
M25	PAL Sealant	tube	90
AC18	Reinforcement Bar in Aluminum	mt	120
AC19	Reinforcement Disc	pc	200

**BUREAU VERITAS**  
Certification



Certification

Awarded to

**PAL MIDDLE EAST PIR (L.L.C.)**

**P.O. BOX 113825, DUBAI  
UNITED ARAB EMIRATES**

Bureau Veritas Certification certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standard detailed below

Standard

**ISO 9001:2008**

Scope of Certification

**PRODUCTION AND SUPPLY OF PRE – INSULATED DUCT PANELS  
AND ACCESSORIES FOR CONSTRUCTION OF AIR DUCTS.**

PERMITTED EXCLUSIONS:

7.3 – Design & Development, 7.5.2 – Validation of Processes for Production and Service Provision

Original Approval Date:

**08<sup>TH</sup> DECEMBER 2008**

Subject to the continued satisfactory operation of the organisation's Management System,

this certificate is valid until:

**07<sup>TH</sup> DECEMBER 2011**

To check this certificate validity please call (+971 4 345 3560)

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation

Date:

**30<sup>TH</sup> OCTOBER 2010**

Certificate Number:

**INDB1350 / R2**

**FARHAN AHMED**

Certification Manager, Bureau Veritas Dubai

Managing office:

Bureau Veritas Certification  
212 Second Floor, Chase Centre  
Al Dhafrah Street, Dubai, UAE

Certification office:

Bureau Veritas Certification (India) Private Limited  
"Marwah Centre" 4<sup>th</sup> Floor, Kalyaneshwar Marwah Marg  
Opp. Anand Industrial Estate, off Feroz Khan Road  
Anandhi (East) Market – 401-072 India

BUREAU VERITAS  
CERTIFICATION (India) P.L.L.  
using the accreditation certificate  
number 008



008



**Bureau of  
Assessment Services**

This is to certify that the

**Environmental Management System of  
PAL MIDDLE EAST PIR L.L.C**

P.O Box: 113825, Dubai, United Arab Emirates.

has been assessed by Bureau of Assessment Services and  
found to be in accordance with the requirements of

**ISO 14001:2004**

This certificate is valid for the activities specified below

**Production and Supply of Pre-insulated Duct Panels and  
Accessories for Construction of Air Ducts**

(ENACE: 3780.4)

Certificate Issue Date : 27<sup>th</sup> June 2010  
Certificate valid till : 26<sup>th</sup> June 2013  
Certificate No : AE-BAS-E0001054

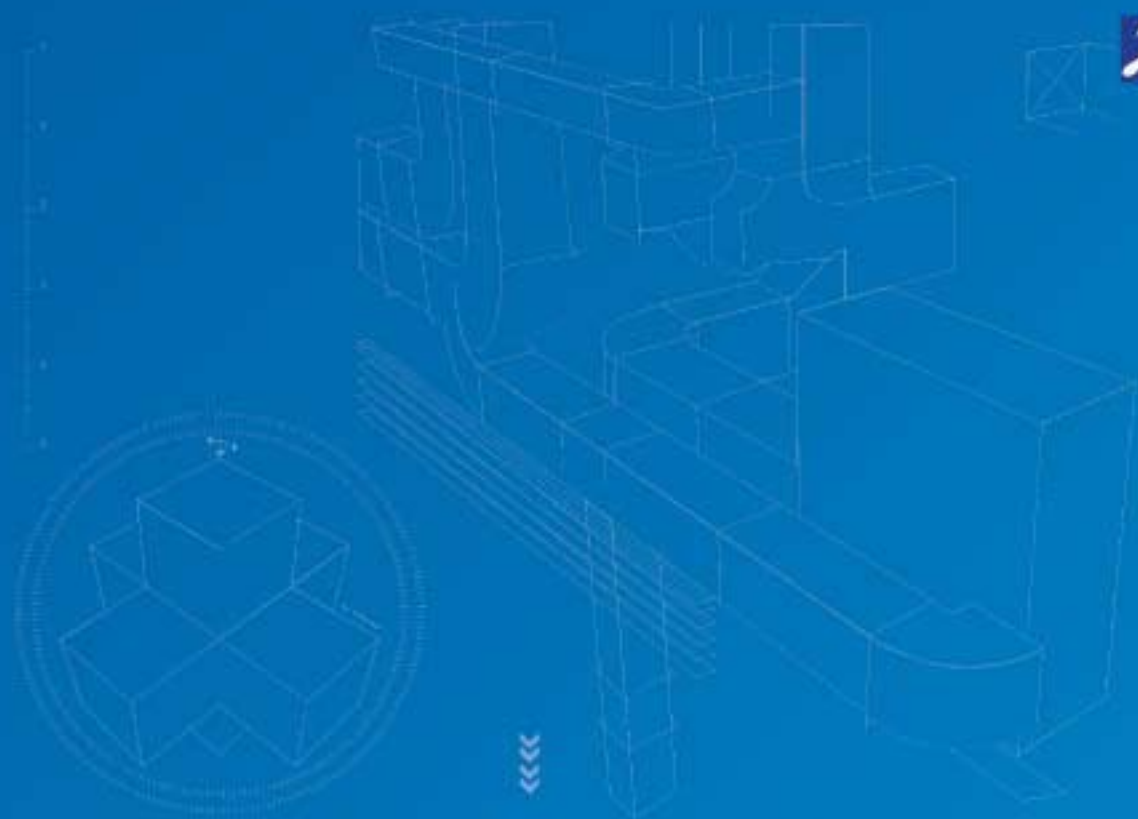
  
Certification Manager  
Bureau of Assessment Services



This certificate remains valid while the holder maintains the Management System in accordance  
with the standards and guidelines above, which will be audited by Bureau of Assessment Services  
through surveillance. This certificate remains the property of Bureau of Assessment Services.

Main Office: Bureau of Assessment Services, P.O. Box: 113825, Dubai, United Arab Emirates  
[www.bureauofassessment.com](http://www.bureauofassessment.com)





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