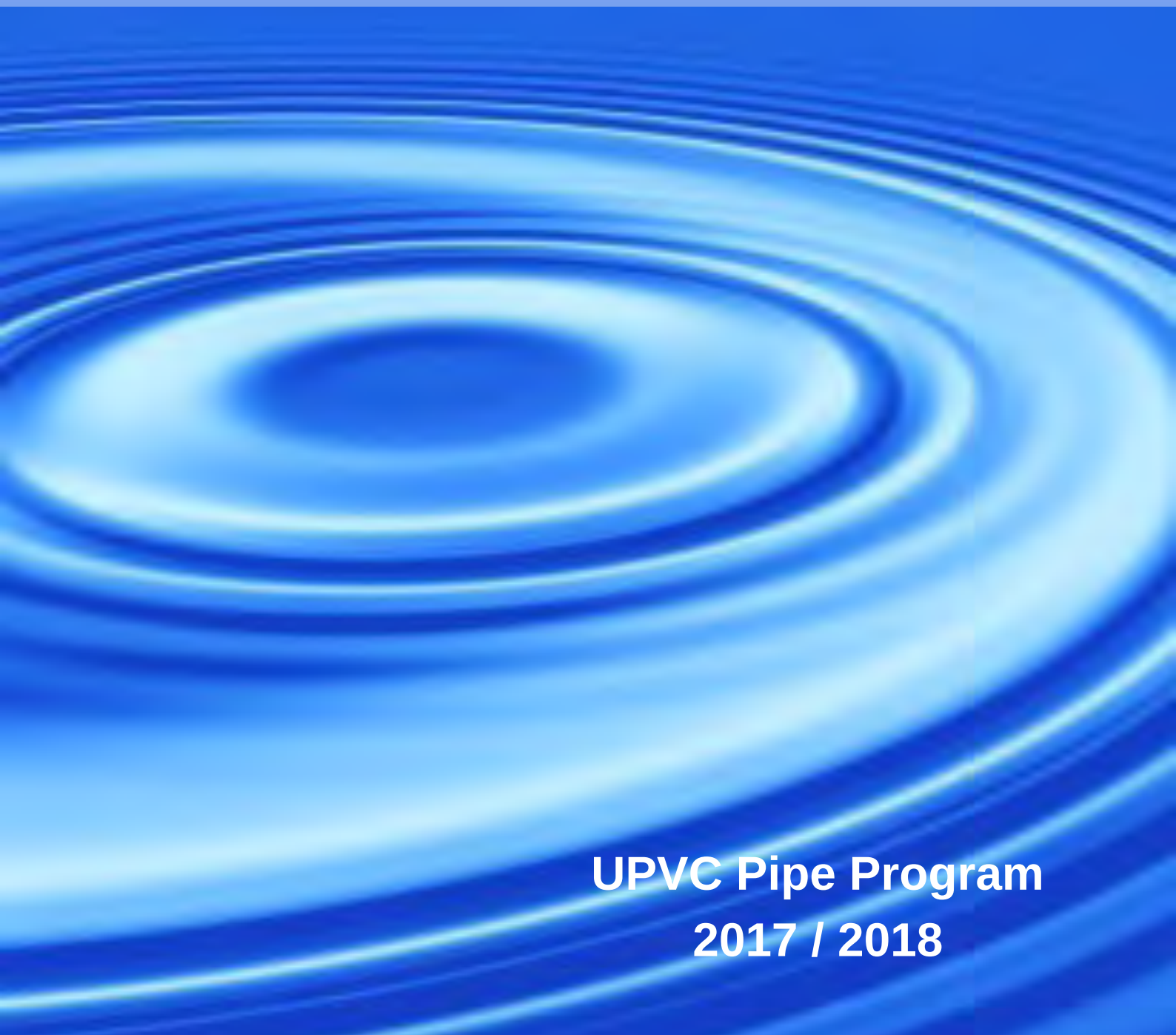
The United Lebanese Plastic Industries sal



UPVC Pipe Program
2017 / 2018

CONFORMITY MARK شارة المطابقة

علامة فارقة... ... MAKES THE DIFFERENCE

The United Lebanese Plastic Industries sal

The United Lebanese Plastic Industries s.a.l.

الشركة اللبنانية المتحدة لصناعة البلاستيك ش.م.ل.

Capital 1.275.000.000 LL - RC 432/69 Baabda—VAT N° 56422-601

Samaha Industrial Complex
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P.O.Box 901903 Jdeideh
Roumieh Lebanon

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Fax :+ 961 (0)1 877 860
email : ulpi@dm.net.lb
web : www.ulpi.co

ISO 9001 BUREAU VERITAS Certification

CSTB le futur en construction

U PVC Lead Free pipes

The United Lebanese Plastic Industries sal

- ***Potable Water and Irrigation Pressure pipes up to PN20***
- ***Soil and Waste pipes inside buildings***
- ***Gravity Sewage and drainage pipe systems***
- ***Electrical and telecom ducting***

By using lead-free additives, we have made all our ranges of pipes environmental-friendly

Established in 1969, The United Lebanese Plastic Industries (ULPI ®) is a family owned business. ULPI specializes in the production of UPVC pipes including waste discharge pipes, drainage and sewer pipes, pressure pipes, electrical and telecommunication cable ducts.

With over 40 years experience in the formulation and extrusion of UPVC, ULPI has become a regional pioneer and intends to remain a loyal partner to decision makers, consultants, and contractors who believe in long term thinking.

With a long-established reputation, ULPI is always investing in research and development to maintain top quality products.

National and International standards

- **NL-EN-ISO-1452,** applicable to UPVC pressure pipes for water conveyance
- **NL-EN-1329 and ISO- 3633** applicable to UPVC pipes for soil, waste, drainage inside building and ventilation.
- **NL-EN-1401 and ISO-4435** applicable to UPVC pipes underground sewer systems, rainwater and storm water networks.
- **NL-EN–61386** applicable to UPVC Conduits for electrical installations

Certificates & Licence

- **ISO-9001:2008** since 2004

Quality Management System, Production and supply of UPVC pipes certification Bureau VERITAS.

- **NL PRODUCT CONFORMITY MARK LICENSE to NL-EN Standards by LIBNOR**

The Lebanese Standards Institution

- Suitability of ULPI pressure pipes for Potable water acc to BS-6920, NL 961 et UE 98/83CE
- Fire-resistance M1 certificate from CSTB-France

*The European Standards referred to here-above have preliminary been voted in December 1997 by the Technical Committee of the **Lebanese Standards Institute (LIBNOR)** and adopted in May-2001 as **NL-EN-1452, NL-EN-1329 and NL-EN-1401 respectively.***

- **REDI ® U-PVC pipes** are made by **ULPI ®** Under License of **REDI s.p.a. Italy**

Approvals

ULPI pipes have been currently installed since 1972 in most public projects, and officially adopted and approved by the major consultants in Lebanon and abroad.

ULPI is committed to a policy of continuous product development and reserves the right to make changes to specifications, colors and prices without notice. The information in this brochure can therefore be given as guidance only.

NL PRODUCT CONFORMITY MARK BY LIBNOR

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Main Characteristics of U-PVC pipes

Excellent fluid flow characteristics, immunity to all types of corrosion, good mechanical strength, light weight, ease of installation, ease of maintenance, non-flammability (self extinguishing; class M1 when e>3mm), good electrical insulation properties (surface resistance 1000V).

Features of pipes made of different materials

(IIP Meeting 15/09/99, from a United States study)

	PVC	PE	GFRP	Stoneware	Cast Iron	Concrete	Steel
Life	++	++	+	++	0	-	0
Corrosion resistance	+	++	+	++	-	+	-
Chemical resistance	+	+	+	++	-	-	-
Rigidity	-	--	-	++	+	++	+
Bacteria and rodent resistance	++	+	+	++	++	-	++
Handling	++	++	0	-	-	--	-
Ease of installation	++	++	++	--	--	0	-
Ease of connection	++	++	-	0	0	--	0
Abrasion resistance	++	+	0	+	+	0	+
Industrial features	++	++	+	+	0	--	0
Key:	++ excellent	+ good	0 average	- sufficient	-- poor		

Material characteristics:

Characteristic	Specification	Test Method
Vicat Softening point	≥79° C	ISO - 2507
Average Density at 23°C	1.37 ≤ r ≤1.50 kg/ cm^3 *	ISO - 1183
Water absorption	≤ 40 g/m^2	EN ISO -62
Resistance to dichloromethane	No attack	EN 580

Mechanical properties:

Characteristic	Specification	Test Method
Impact Resistance Round-the-clock method @ 0°C	TIR ≤ 10%	EN-744
Resistance to hydrostatic pressure @ 60°C, 1 hour	Induced stress ≥10 MPa	ISO - 1167
Tensile strength at 23°C	≥45 Mpa	ISO - 6259
Longitudinal reversion	≤ 5 % @ 150°C	ISO - 2505

For contaminated waste-water such as industrial discharges, chemical and temperature resistance have to be taken into consideration, guidance is given in ISO/TR10358, ISO/TR7620.

Some PVC Facts·

Beneficial to Public Health
PVC is Clean and Safe

It is so safe that it is used for intravenous medical tubing, and it is the pipe of choice for ecologically sensitive environments like salt water aquariums

Best Choice for the Environment

PVC piping is one of the world's most sustainable products, making it ideal for long-term term use in underground infrastructure. It requires less energy and fewer resources to manufacture than old-technology materials, and its production creates virtually no waste.

Moreover, it is produced with sustainable and abundant resources: chlorine, which is derived from salt, and domestically produced natural gas, which helps reduce consumption of imported oil. (**PVC = 58%** d **Salt + 42%** d **Oil**).

Clean and Safe Manufacturing

PVC pipe manufacturing is extremely efficient, with virtually 100 percent of the PVC compound being used. It takes four times less energy to make than concrete pipe, and half that used for iron pipe.

There are no smoke stacks at PVC pipe facilities and the product is completely recyclable, making its environmental footprint far smaller than competing piping materials.

A Smaller Human Footprint

PVC pipe's ultra-smooth surface reduces pumping costs and its leak-free joints eliminate water loss – which can be up to 40 percent in some old-technology and corrosion-prone piping networks.

Two Million Miles of Sustainable Piping

PVC leads all other piping materials in sustainability. Its durability, soundness, clean and energy efficient manufacture and transportation have made it the material of choice for water and wastewater applications.

The Number One Piping Material

PVC the number one piping material for water and wastewater infrastructure.

PVC Pipe: High Quality and Performance Standards

The quality and performance of PVC pipe are assured by a wide array of tough standards, control tests and independent certifications.

Source: Uni-Bell PVC Pipe Association

PRESSURE PIPES

NL-EN-ISO 1452

lead free

Potable water

►Potable water, Irrigation and swimming pools, Drainage and sewerage under pressure. Buried and above ground.

- pressure: PN10 PN16; PN20 (PN 6,8,12 upon request)
- Cold water from 20°C to 45°C
- Starting Outer Diameter 20 mm up to 315mm
- Color: dark grey RAL 7011
- Direct Burial
- Solvent Cement Welding & Push fit pressure Rubber Ring

SOIL AND WASTE SYSTEMS

NL-EN-1329

lead free

Inside Buildings

►Waste and soil installation discharge within the building structure

- Low & High temperature → = Minimum wall thickness: 3 mm
- Starting 32 mm diameter up to 200mm.
- Color: light grey RAL 7037
- Solvent cement welding preferred when recessed in concrete.

GRAVITY SEWER SYSTEMS:

NL-EN 1401

lead free

Underground installation

►Gravity sewer & rain water

- Starting 110 mm diameter
- Color: orange-brown RAL 8023
- Rubber Ring push fit socket.
- The Most Adapted in seismic areas
- Area Codes U and UD
- Direct Burial
- Two classes for **Traffic Load**

SN 4 (SDR 41) normal burial Depth between **0.90 meter and 6 meter**

SN 8 (SDR 34) heavy duty soil condition & burial between **0.60 meter and 9 meter**

Nota: (SN2 (SDR 51) requires costly protection and is not accepted under heavy load traffic)

NL CONFORMITY MARK
LICENSE

No. 01/2008

LIBNOR hereby grants to:
The United Lebanese Plastic Industries S.A.L
Samaha Industrial Complex
Roumieh Road
Jdeideh – Nahr el Mott Lebanon

In respect of:
Unplasticized Poly (Vinyl Chloride) Pipes (PVC-U pipes) (ULPI)

According to:
NL EN 1401-1*
Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinylchloride) (PVC-U). Specifications for pipes, fittings and the system

The right and License to use the NL Conformity Mark in accordance with LIBNOR general scheme (P6P1-G1) governing the use of the NL conformity mark.
The use of the Conformity mark is authorized in respect of the product, manufactured at, or provided from, the address above and in conformity with the standard detailed above.

For and on behalf of LIBNOR:

GHAZIRI Habib, Chairman, LIBNOR.
Date: 1/8/2016 *Fifth granted: 1/6/2016* *Valid until: 31/5/2018*

* The latest version adopted by LIBNOR is applicable

The Lebanese standards Institution- LIBNOR
Sin El Fil/Dekweneh, City Rama Street, LIBNOR BLDG; P.O Box: 55120 Sin El Fil-Lebanon;
Tel: +9611485927- Fax: +9611485929. E-mail: libnor@libnor.org Website: www.libnor.org

BUREAU VERITAS Certification

UNITED LEBANESE PLASTIC INDUSTRIES S.A.L. (ULPI)
Main Road-Roumieh-Lebanon

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2008

Scope of certification

PRODUCTION AND SUPPLY OF UNPLASTICIZED PVC PIPES, PROFILES, DUCTS AND FITTINGS AND SALE RELATED MISCELLANEOUS ITEMS

Original cycle start date: 23-December-2004
Expiry date of previous cycle: 20-January-2017
Recertification Audit date : 07-November-2016
Recertification cycle start date: 29-November-2016

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: 14-September-2018

Certificate No. IND 16.6410 U /Q Version : No.1 Revision date: 29-November-2016

Signed on behalf of BVCH SAS UK Branch

Certification body address: 5th Floor, 66 Prescot Street, London E1 8HG, United Kingdom
Local office: Bureau Veritas Liban SAL – Dabayeh Center 5th Floor – Dora - Lebanon

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation.
To check this certificate validity please call: 961 1 240540 / 60

UKAS

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The United Lebanese Plastic Industries sal

NL-EN STANDARDS AND INTERNAL TESTS

** Pipes are considered compliant to the standard **only** if the following **in-house** tests have been carried out successfully in line with NL-EN Standards:*

LIBNOR PRODUCT CONFORMITY MARK ACCORDING TO NL- EN STANDARDS

NL- EN Standards provide:

- *Scope, definitions, general characteristics: material, appearance, color, opacity, etc*
- *Nominal Dimensions: diameter, thickness, tolerance, socket*
- ***Mechanical/ Physical/ Chemical Characteristics***
- *Normalization of Marking*
- *Guidance for Design, including derating factors*
- *Guidance for Installation*
- *Recommended Practice for the Application*
- *Rules for Assessment of Conformity*

Visual control: aspect, roughness, opacity, conformity of color, shape of socket, spigot, chamfer, porosity, detect any trace of burning, clean cut, no irregularities, ... all those controls are performed without magnification, they allow to detect any eventual trouble in the manufacturing process at the closest points of the extrusion lines

Dimensional control: outside diameter, wall thickness (8 points), overall length, useful length, conformity of socket (length, groove, etc...), out of roundness, angle of chamfer, length of chamfer, mean outside diameter, measured with the adequate calibrated measuring instruments. (mean wall thickness by calculation)

Gelation: product is tested by immersion in methylene chloride, a very corrosive solvent, at 15°C during 30 minutes. Product tested should show no attack at any point of the pipe (internal, external, through the wall), proving that the fusion temperature has been reached. If this point is not reached, the filler used in the formulation for lubrication flows between the molecules to the surface, and proves that the polymerization is not complete, and thus: that the properties of uPVC are not met.
This ageing test reveals the imperfection of the product. A product is in compliance if the mix of temperature-pressure-speed is well tuned in order to reach the fusion point (very variable acc to product, conditions, material, ...) but still not reaching the degradation stage (burning); because the measurement of the degree of fusion is very costly and almost impossible to obtain with the number of variables, the solvent test is a substitution considered as very accurate.

Longitudinal reversion: a sample of the product is immersed in an oven during 30 minutes at 150 °C: all tensions are released at this temperature considered as the beginning of fusion (fulfilled at 180 degrees). The product is then cooled at ambient temperature, and the deformation measured (shrinkage acceptable if smaller than 5%. This test helps to identify some processing abnormalities that might affect the pipe dimensions at long term, by evaluating the effect of heating on the pipe.

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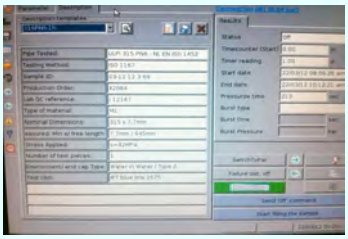
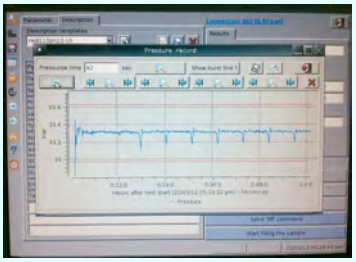
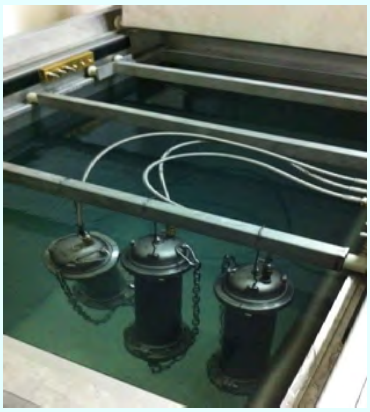
NL-EN STANDARDS AND INTERNAL TESTS







Vicat softening point: a sample is immersed in oil and the temperature is elevated from ambient until it reaches it s softening point (minimum acceptable is 79°C). Softening point is reached when a calibrated needle under a weight of 5kg penetrates up to 1mm into the product. Higher point demonstrates the ability of the pipe to withstand high temperature (especially for soil and waste, as well as for pressure pipes)

Impact resistance: a calibrated weight from a specified height falls on the product a number of times, without any friction: passing the test demonstrates the impact resistance of the PVC product.

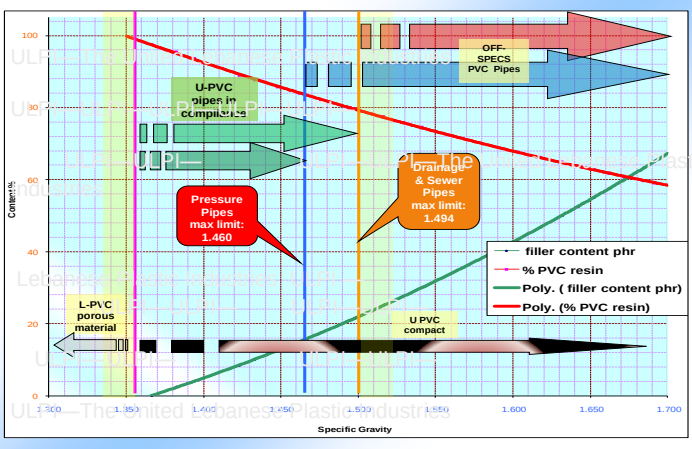
Marking: should be in compliance with the requirements of the standard as well as those of the brand, should include all useful data allowing the traceability of the manufacturing process and all the steps of the quality control

Pressure Testing according to ISO 1167: Carried out regularly at high pressures, with comfortable safety factors, to demonstrate that the product may be used in normal conditions, at the working pressure rated on the product.

Suitability for Potable Network: since our standard pressure pipes are manufactured lead-free, we also are in a position to provide the results of suitability for drinking water installation (metal content in compliance with the regulations as defined by Ministry of Health) tests performed externally (IRI)

Specific gravity: it allows to verify that the PVC content complies with the requirements of the standard (at least 80% by mass for soil and waste, and more than 88% for pressure pipes), failing which the pipe will not withstand long term operation (50 years). This test allows demonstrating that the filler content (calcium carbonate used as lubricant) does not exceed a reasonable percentage of the mixture. By using calibrated graphics, it gives more or less the same results as the ash test.

Specific Gravity vs Filler Content



PRESSURE PIPES
BURIED AND ABOVE GROUND

ULPI® Rigid U-PVC

LIBNOR
PRODUCT
CONFORMITY MARK
ACCORDING TO
NL-EN- ISO 1452

Compact Pressure Pipes

These pipes are designed for the conveyance and supply of potable water under pressure, in compliance with requirements of:

NL-EN–ISO 1452.

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lead free, suitable for potable water

NL- EN- ISO 1452

working pressure in bars at 20°

Nominal Rating	PN10			PN16			PN20		
external diameter D	socket	wall thick. s	Weight kg / lm	socket	wall thick. s	Weight kg / lm	socket	wall thick. s	Weight kg / lm
(mm)		(mm)		(mm)			(mm)		
20							#	2.0	0.16
25							#	2.5	0.26
32				#	2.4	0.32	#	3.0	0.40
40				=	3.0	0.51	=	3.7	0.61
50	=	2.4	0.52	=	3.7	0.78	=	4.6	0.95
63	=	3.0	0.82	=	4.7	1.25	O	5.8	1.51
75	=	3.6	1.17	=	5.6	1.77	O	6.8	2.12
90	=	4.3	1.68	=	6.7	2.55	O	8.2	3.06
110	= O	4.2	2.03	= O	6.6	3.11	O	8.1	3.77
125	O	4.8	2.63	O	7.4	3.97	O	9.2	4.86
160	O	6.2	4.35	O	9.5	6.52	O	11.8	7.98
200	O	7.7	6.76	O	11.9	10.21	O	14.7	10.21
250	O	9.6	10.53	O	14.8	15.88			
315	O	12.1	16.72						

Standard production *Special orders*

O: R/R Integral socket with push-fit pressure Rubber Ring
=: S/C Solvent Cement socket
#: P/E Plain Ends

Supplied in 6 meters total length (L)

ULPI ® Rigid UPVC Compact Pressure Pipes

This range is intended to be used at working pressures from 10 bars (PN 10) up to 20 bars (PN20), buried and above ground, for the conveyance and supply of potable water under pressure, irrigation, drainage and sewerage under pressure and general purposes up to 25°C at the indicated nominal pressure and to 45°C (cold water) after application of a derating factor.

- ***Suitable for potable water***
- ***Manufactured in compliance with requirements of: NL-EN–ISO 1452.***

This EN standard replaces former European standards; NF, BS, DIN etc.

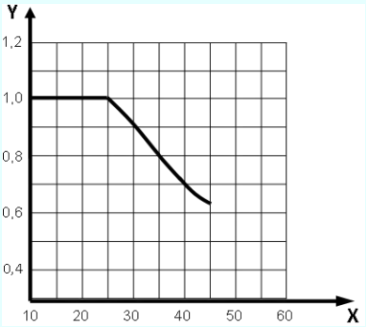
The seal profile geometry with retaining, cleaning and sealing parts provides a sealing function with a double effect: lip and compression sealing.

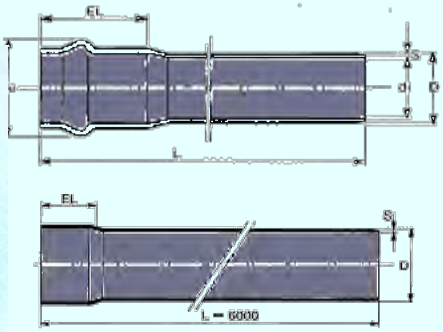
Other ratings; PN6, PN8, PN12, upon request only.

Seal: Hardness: 60 ± 5 SHA in accordance with NL-EN-681.

X service temperature, in degrees Celsius

Y derating factor, ƒT





SOIL & WASTE PIPES INSIDE BUILDINGS

ULPI® Rigid U-PVC Compact Soil & Waste pipes

These pipes are designed for both systems inside building and buried in ground within the building structure in compliance with : NL-EN-1329.

LIBNOR PRODUCT CONFORMITY MARK

ACCORDING TO NL-EN- 1329

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ULPI® Rigid U-PVC

Compact Soil & Waste pipes

This range of pipes **CR4 (ring stiffness ≥ 4kN/m²)** is perfectly adapted for plastic systems intended for the transportation of soil and waste discharge of domestic and industrial origin (low and high temperature : **minimum thickness of wall 3 mm.).**

They are also suitable for ventilation pipe works, and rainwater networks within the building structure, under normal conditions.

For installation techniques and instructions, please refer to ISO/TR 7074 or ENV 13801.

NL-EN-1329

Designation BD	Outside diameter in mm	Wall thick. in mm	Weight kg / lm
32 CR4	*32*	**3.0**	0.430
50 CR4	*50*	**3.0**	0.690
75 CR4	*75*	**3.0**	1.070
100 CR4	*100*	**3.0**	1.400
110 CR4	*110*	**3.2**	1.690
125 CR4	*125*	**3.2**	1.930
160 CR4	*160*	**4.0**	3.050
200 CR4	*200*	**4.9**	4.680

Supplied in 6,00 meters total length (L), other length upon request.
Colour: light grey (approximately RAL 7037).
Socket: integral, spigot chamfered
Nominal Ring Stiffness ≥ 4 kN/m2

Discharge within the building Structure

LOW AND HIGH TEMPERATURE

- **Low & high discharge temperature & Fire Rating M1→ Minimum wall thickness : 3mm**

100 % Eco—Friendly → Lead Free

This EN standard replaces former European standards; NF, BS, DIN

SOLVENT CEMENT JOINING

- Solvent cement welding preferred when recessed in concrete.

A B C



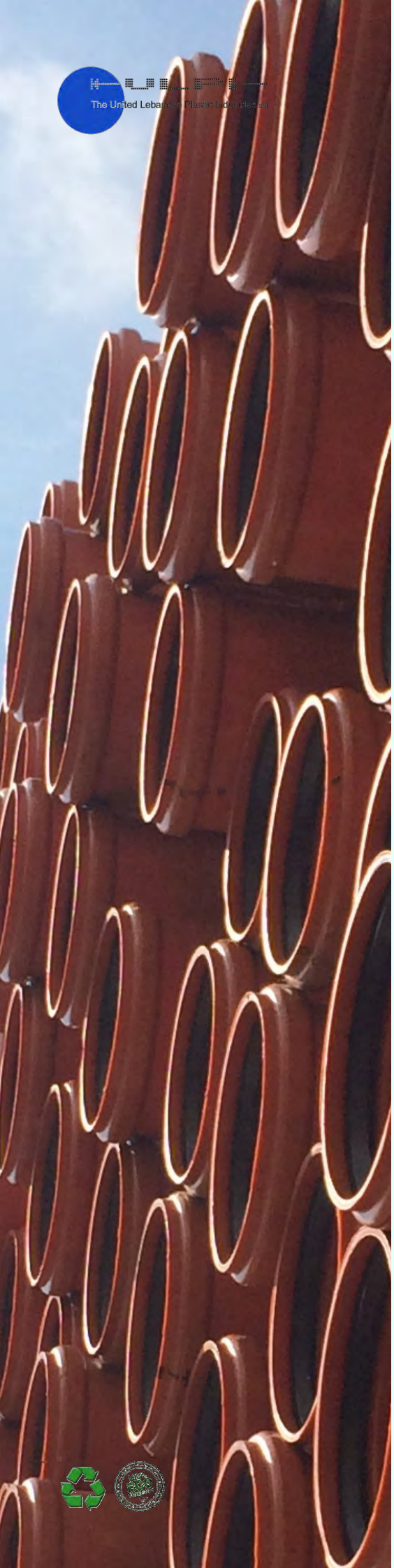
D E F



Quantity of Cement and Cleaner

Required Quantity for 100 sockets

Ø dn	CEMENT	CLEANER
20 - 25 - 32	250 ml	125 ml
40 - 50 - 63	1 liter	250 ml
75 - 90 - 110	2 liter	0.5 liter
125	3 liter	1 liter
160	5 liter	2 liter
200	9 liter	3 liter
250	12 liter	4 liter
315	20 liter	6,5 liter



GRAVITY SEWER PIPES SN4

ULPI® Rigid U-PVC Compact Gravity Sewer Pipes

These pipes are designed for underground storm water, gravity sewerage and drainage networks, in compliance with NL-EN-1401.

LIBNOR PRODUCT CONFORMITY MARK ACCORDING TO NL-EN -1401

الشركة اللبنانية المتحدة لصناعة البلاستيك ش.م.ل.

ULPI® Rigid U-PVC

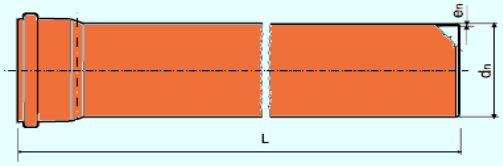
Gravity Sewer Pipes SN4

This range of pipes **SN4 (ring stiffness≥ 4kN/m²)** is perfectly adapted for **urban sewer networks under Normal conditions with traffic load.**

SN4 sewer pipes can be **directly buried underground between 0.9 and 6 m depth** (expected average deflection less than 8%).

NL-EN-1401 SN4				
Designation SDR 41 UD	OD in mm	Wall Thick. in mm	Weight in kg/lm	
110 SN4/SN8	110	3.2	1.690	
125 SN4	125	3.2	1.930	
160 SN4	160	4.0	3.050	
200 SN4	200	4.9	4.680	
250 SN4	250	6.2	7.330	
315 SN4	315	7.7	11.480	
400 SN4	400	9.8	18.300	

Supplied in 6 meters total length (L).
Colour: orange-brown (terracotta, approximately RAL 8023).
Socket: integral, spigot chamfered for easy installation.
Each pipe is fitted with a push-fit lip seal rubber ring ac. to NL-EN 681



*** NL- EN 1401 National foreword:** *" If **SN 4 or SN 8** classes have to be used, the system should be installed in accordance with NL- EN 1610 :* "Construction and testing of drains and sewers"*, in order to achieve the intended resistance to long-term deformation."*

" If SN 2 class of pipe or fitting is intended to be used, , the installation should first be subject to a structural design soil load calculation , classification of soil, and the installation technique modified to suit the results of that calculation. The appropriate calculation is given in NL- EN 1295-1."

*(The **SN2** class of pipes are usually installed under pathways without load.)*

This EN standard replaces former European standards; NF, BS, DIN

100 % Eco-Friendly → Lead Free

PUSH-FIT RUBBER RING JOINING

Distance between supports CEN/TR 13801 : 2014

Nominal OD d_n Ø mm	Horizontal pipe work D_{max} m	Vertical pipe work D_{max} m
32	0.5	1.2
40	0.5	1.2
50	0.5	1.5
63	0.8	1.5
75	0.8	2.0
90	0.9	2.0
110	1.1	2.0
125	1.25	2.0
160	1.6	2.0
200	1.7	2.0
250	2.0	3.0
315	3.0	3.0

Approximate quantity of lubricant needed	
Ø d_n mm	1 assembly in g
63	10
75	15
90	20
110	30
125	40
160	60
200	90
250	120
315	165
400	190

A

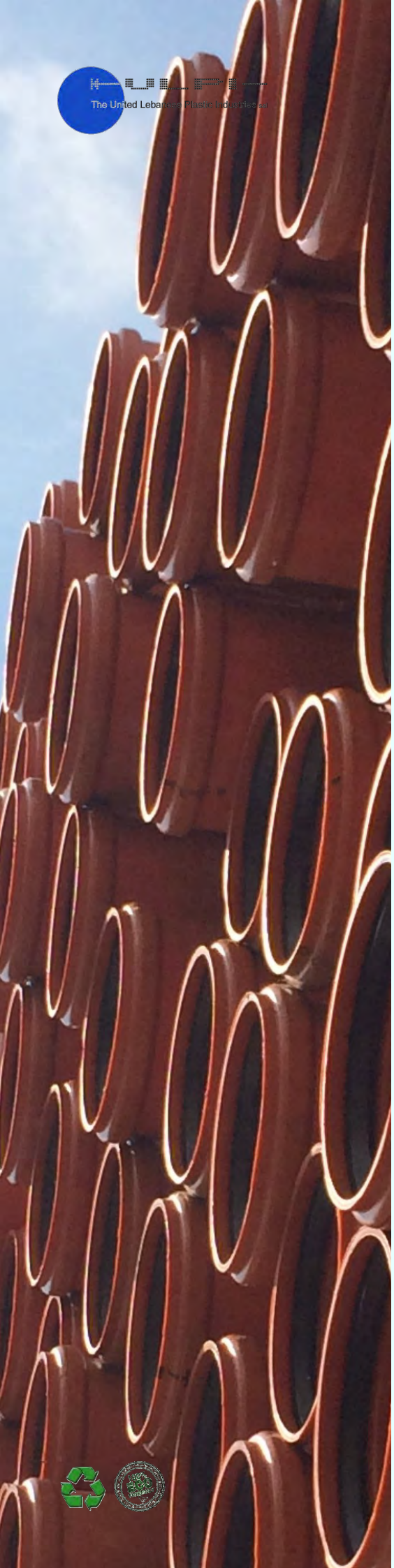
B

C

D

E

F



GRAVITY SEWER PIPE SN8

ULPI® Rigid U-PVC

Gravity Sewer Pipes SN8

This range of sewer pipes **SN8 (ring stiffness ≥ 8kN/m²)** is perfectly adapted for **urban sewer networks under Heavy-Duty soil conditions with traffic load.**

SN8 sewer pipes can be **directly buried underground between 0.6 and 9 m depth**
(expected average deflection less than 8%).

SN 8

RING STIFFNESS ≥ 8 KN/M2

LIBNOR PRODUCT CONFORMITY MARK ACCORDING TO NL-EN– 1401

100% Eco-Friendly → Lead Free

NL-EN-1401 SN8

Designation SDR 34	OD in mm	Wall Thick. in mm	Weight in kg/lm	
110 SN8	*Same as*	*110SN4*		
125 SN8	*125*	**3.7**	2.210	
160 SN8	*160*	**4.7**	3.580	
200 SN8	*200*	**5.9**	5.600	
250 SN8	*250*	**7.3**	8.600	
315 SN8	*315*	**9.2**	13.650	
400 SN8	*400*	**11.7**	21.680	

Supplied in 6 meters total length (L).
Colour: orange-brown (terracotta, approximately RAL 8023).
Socket: integral, spigot chamfered for easy installation.
Each pipe is fitted with a push-fit rubber ring acc. to NL-EN 681

For bedding, laying and filling instructions, please refer to ISO/TR 7073 or NL-EN 1610.

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SLOTTED UNDERDRAIN PIPE

ULPI® Rigid U-PVC compact underdrain pipe is supplied with precision-machined slots, which provide greater intake capacity and continuous, clog-resistant drainage of fluids.

Applications include, but are not limited to, subsurface drainage around residential and commercial buildings and infrastructure works, drainage and dewatering applications under roads and highways, leachate collection systems for solid waste landfills.

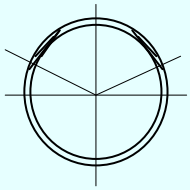
ULPI® Slotted Underdrain Pipes fulfill requirements of standards DIN-4262 and **NF P 16-351 type R2 SD**: Round drainage pipe with smooth internal surface (R2) designed for Standard Duty applications (SD).

Slots Design MP: slots are located on the upper 135° of the pipe. The lower part of the MP pipe will carry away drained water. Wall thickness according to **NL-EN-1401 SN4.**

NF P 16-351

Designation R2 SD -MP	OD in mm	Discharge Area in cm^2	Water Inlet Area cm^2/m	Slot Type	
110 R2 SD	***110***	83	>50	**MP**	
125 R2 SD	***125***	109	>50	**MP**	
160 R2 SD	***160***	178	>70	**MP**	
200 R2 SD	***200***	280	>80	**MP**	
250 R2 SD	***250***	441	>90	**MP**	
315 R2 SD	***315***	702	>110	**MP**	

Supplied in 6 meters total length (L).
Colour: orange-brown (terracotta, approximately RAL 8023).
Socket: integral, spigot chamfered for easy installation.



ELECTRICAL & TELECOMMUNICATION CABLE DUCTS

Heavy Metal Free (RoHS)

***ULPI®** rigid U-PVC standard ducts are designed for electrical distribution inside buildings, concrete encasement of power supplies, telecommunications, street lighting, distribution systems & networks.*

LIBNOR
PRODUCT CONFORMITY MARK

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Type **EB** ***SN 2*** Designed for **ENCASED BURIAL** in concrete.

Type **MB** ***SN 4*** Designed for **DIRECT BURIAL** (without encasement in concrete) suitable for installation between **0.9 m** and **6 m** underground

Type **DB** ***SN 8*** Designed for **DIRECT BURIAL** under heavy-duty conditions and suitable for installation between **0.6 m** and **9 m** underground

Outside Diameter (in mm)	*50*	*75*	*100*	*110*	*160*	*200*
Wall Thickness	-	-	2.0		3.2	3.9
EB type **SN 2**						
Wall Thickness	-	-	2.5	-	4.0	4.9
MB type **SN 4**						
Wall Thickness	1.8	2.3	3.0	3.2	4.7	5.9
DB type **SN 8**						

Delivered in 6.00 meters total length, Socket Cement Color: light grey (RAL 7037).

Red optional RAL 3000.

***EB** type. Ring Stiffness **2 kN/m²**, SDR< 51,*

This type complies with NL-EN 1401 (SN2)& NL-EN1329-1 Type B for OD 160 & 200, and NFT-54.018 for Telecom. ducts OD 100.

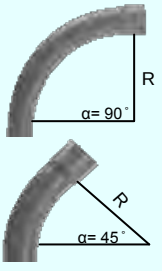
***MB** type Ring Stiffness **4 kN/m²** , SDR< 41,*

Complies with requirements of standard NL-EN 1401 (SN4) for OD 160 & 200 only.

***DB** type Ring Stiffness **8 kN/m²**, SDR< 34,*

Complies with NL-EN 1401 (SN8) for OD 110 and above, NL-EN 1329 BD for OD 100, and NL-EN-ISO 1452- PN 6 for OD 50 & 75.

LONG BENDS M/F	*50*	*75*	*100*	*110*
R = 210 mm α= 45°				
R = 450 mm α= 45°				
R = 210 mm α= 90°				
R = 450 mm α= 90°				



T U B E L E C ® *I R L 4 4 3 1 1250 N /5cm*

RIGID UPVC ELECTRICAL CONDUITS

NL - EN 61386-1 & 21

Tests according to NL - EN 61 386-1 & 21

Dimensional and visual control, Marking

Impact Test

After conditioning for 2 hours at -15°C, samples are tested by using a 2 kg hammer from a falling height of 30cm. Then, when samples reach 20°C, it shall be possible to pass the specified gauge through the conduit.

Compression Test

Compression force of 1250N 5/cm shall be applied on the samples. After loading for 60s, the difference between initial outside diameter (O.D.) and flattened O.D. shall not exceed 25 % of the initial O.D.

Sixty seconds later, the compression force is removed: the difference between initial O.D. and the new O.D. shall not exceed 10%. Samples shall have no cracks.

Bending Test

Bending is done at -15°C. Samples shall have no cracks. It shall be possible to pass the specified gauge

Collapse Test

90° bended samples are conditioned for 24 hours at 60 °C. It shall be possible to pass the specified gauge.

Dielectric strength

After applying a test voltage of 2000 V for 15 min. The 100 mA trip device shall not trip during the test.

Insulation resistance

500V D.C. is applied for 60s. The measured insulation resistance shall be greater than 100 mΩ

Thermal Properties

After conditioning for 4h at 60 °C, a mass of 4 kg is applied for 24h. It shall be possible to pass the specified gauge

Reaction to fire

A flame is applied for 35s. No burning or charring within 50mm from the extremities, flame shall die out within 30s.

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The United Lebanese Plastic Industries sal

INTERNATIONAL STANDARDS

TUBELEC ® Electrical conduits are manufactured in compliance with requirements of the **European and Lebanese Standard NL- EN 61 386**(parts 1 & 21). Heavy Metal Free (RoHS).

The text of the **International Standard IEC 61386:2008** was approved by CENELEC as a European Standard without any modification.

NL-EN 61386 1-21 *Heavy Metal Free (RoHS)*

HEAVY DUTY HD 1250 N/5CM *IRL 4431

Designation of standard conduits:
Conduits are designed according to their mechanical characteristics with a code:
3 or 4 letters +4 digits: ***ABCD XXXX***
Coding example for a **TUBELEC® heavy duty (hd) IRL4431** conduit

Rigid UPVC (Unplasticized Polyvinyl-Chloride) compact conduits are designed for heavy duty (hd) applications.

These conduits are intended to be used in electrical distribution systems inside buildings.

	Resistance to Compression N /5cm			Resistance to Impact J			Lower Temp. Range °C			Upper Temp. Range °C	
1	Very Light	125	1	Very Light	0.5J	1	+5	1	60
2	Light	320	2	Light	1J	2	-5	2	90
3	Medium	750	3	Medium	2J	3	-15	3	105
4	Heavy	1250	4	Heavy	6J	4	-25	4	120
5	Very Heavy	4000	5	Very Heavy	20J	5	-45	5	150

Very light : Not accepted for Rigid UPVC conduits
Light conduit systems are not allowed in Europe

MAIN CHARACTERISTICS

- Corrosion resistance: resistant to acids, bases and salts.
- light weight, ease of installation, ease of maintenance.
- Non-conductive: good insulation, able to resist 25kV voltage
- Fire resistant: self extinguishing, do not support combustion.
- Impact strength: resistant to compression and impact, can be buried in concrete.

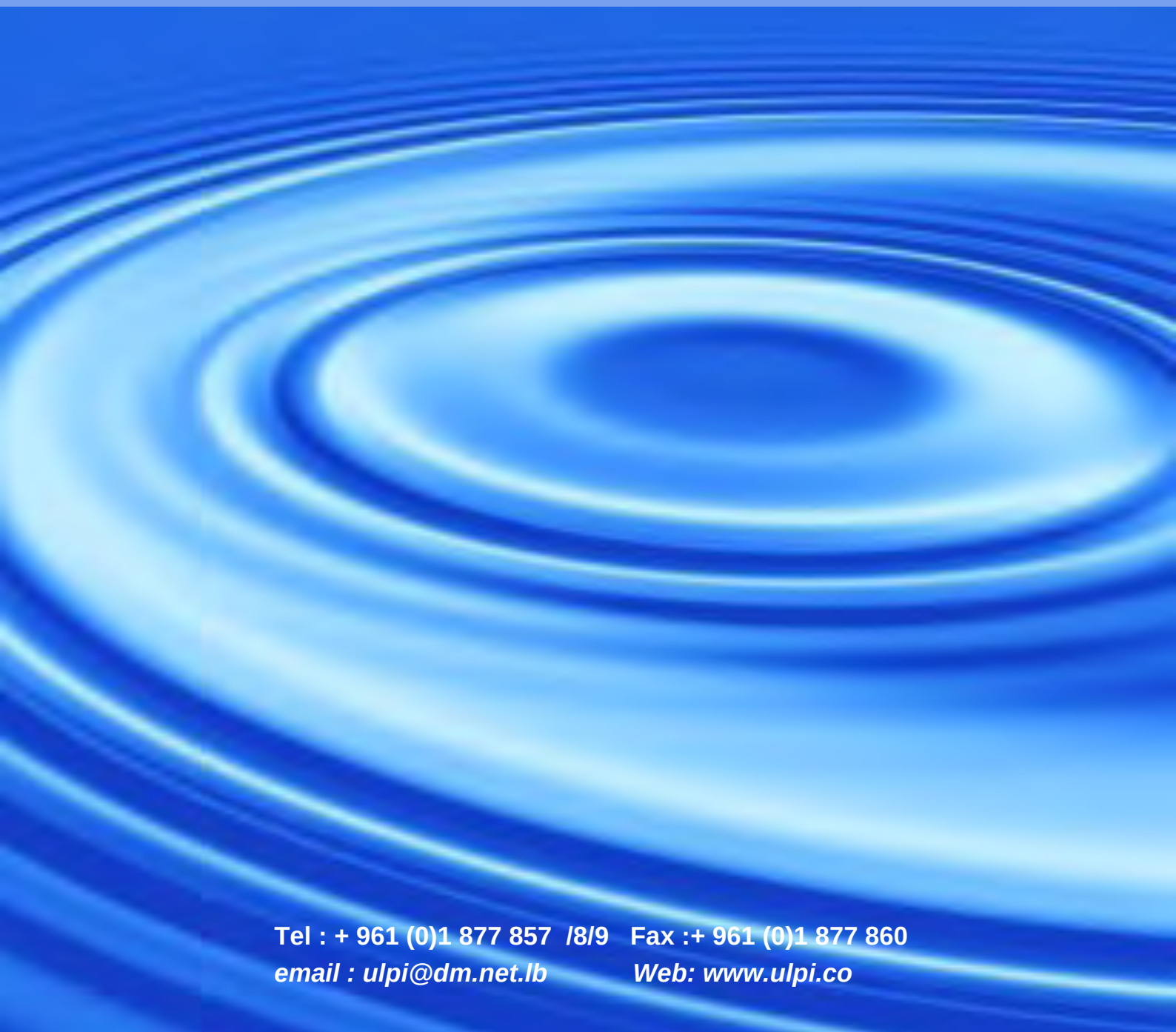
HEAVY DUTY HD
*IRL 4431
1250 N/5CM

Standard conduit delivered in 2.90 m overall length.
Plain ends
***Color: Grey-White** approx. **RAL 9002**.*

Nominal Size	Out. Diam mm	Wall Thick mm	Min. Int. Diam mm	Pack Qty pcs	Total L m
16 hd	$16^{+0}_{-0.3}$	**1.5**	12.6	**50**	*145.0*
20 hd	$20^{+0}_{-0.3}$	**1.7**	16.4	**32**	*92.8*
25 hd	$25^{+0}_{-0.4}$	**1.8**	21.2	**19**	*55.1*
32 hd	$32^{+0}_{-0.4}$	**2.1**	26.7	**14**	*40.6*
40 hd	$40^{+0}_{-0.4}$	**2.2**	35.6	**8**	*23.2*

** IRL = Isolant Rigide Lisse (F) Insulated Rigid Smooth Conduit*

ULPI® : pipes you can trust.



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