NAF® S Fire Suppression Systems



GIULIANO INDOVINO

MANAGING DIRECTOR &

SALES





- ► Founded in 1990
- Production plant in Avezzano, 120 km east of Rome





our 5.500 m² plant

our office



Production of clean agent fire suppression systems

▶ R&D

Testing facilities



Our mission? ... the production of fire protection solutions meeting the highest possible level of safety and quality!





Quality management systems:

- ▶ ISO 9001
- ▶ LPCB UK FPS





Certified to EN 12094-4, -8, -13 LPCB Ref. No. 969a





THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

DQS Holding GmbH has issued an IQNet recognized certificate that the organization

SAFETY HI-TECH S.r.I.

Production Site: Via Cavour, 96 67051 Avezzano (AQ) Italy Registered Office: Via Bellini, 22 00198 Roma Italy Office: Via Degli Olmetti, 39/E 00060 Formello (RM) Italy

has implemented and maintains a Quality Management System.

Scope:

Design, manufacture and sales of fire extinguishing agents and of extinguishing systems.

Management of weighing process.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001: 2015

Issued on:

2018-10-08 2021-10-07

Expires on: 20

This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document.

Registration number: DE-452235 QM15

- Net

Alex Stoichitoiu President of IQNet Michael Drechsel
Managing Director of
DQS Holding GmbH

IQNet Partners*:

AENOR Spain AFNOR Certification France APCER Fortugal CCC Cyprus CISQ Italy
CQC China COM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany FGAV Brazil
FONDONORMA Venezuela (CONTEC Colombia Inspecta Sertification Oy Finland INTECO Costa Rica
IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland
VICE-SIGE México PCBC Poland Quality Austria Austria R Russia Stil Israel SIQ Sloveniel
SIRIM QAS International Malaysia SQS Switzerland SRAC Romania TEST SI Petersburg Russia TSE Trutey YUQS Serbia
IONE is represented in the USA by AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

^{*} The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com





www.redbooklive.com

Certificate of Product Approval

Certificate Number: 969a

Issue: 04



Safety Hi-Tech Srl

Via Cavour 96 - 67051 Avezzano (AQ) Italy

is authorised to use the LPCB mark in association with the product(s) listed in this certificate and appendio having complied with the requirements of the standard(s) as detailed below:

Products

NAF S 125 & NAF S 227 Fire Fighting Components

(refer to attached Appendix for details)

Standards

EN 12094-4;2004

Fixed firefighting systems. Components for gas extinguishing systems. Requirements and test methods for container valve assemblies and their actuators

EN 12094-8:2006

Components for gas extinguishing systems.
Requirements and test methods for connectors

EN 12094-13:2003

Components for gas extinguishing systems. Requirements and test methods for check valves and non-return valves

This certificate and appendix is maintained and held in force through regular surveillance activities



Robert Brown

24 November 2016

01 July 2010 Date of First Issue

Signed for LPCE



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To check the subject of this certificate and appendix please visit <u>www.vrefbookher.combiners.</u> scan the QR tag or contact us.

LPCB is part of BBC Global Ltd. Carbon, Waterier, W205 9007

T.+44 (0)333 321 8811 E.+44 (0)1923 664603 E. <u>preparties@threglobal.com</u>



BF1317A Rev 0.1

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Clean agent sampling



Clean agent quality testing





Pressure and dimensional quality control testing of all system components







Thread ring gauge testing of all system components

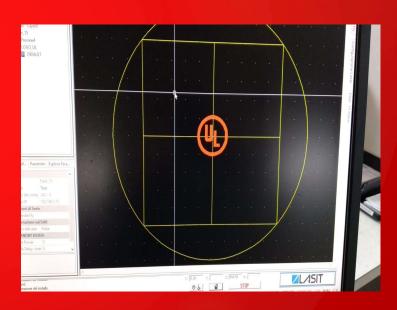






Marking of all components as per UL, LPCB/CE and DNV requirements







Assembling systems







Filling and leak testing system cylinders







Nozzle area coverage testing as per UL 2166









Extinguishing testing on class a and b fuels as per UL 2166







wood crib

heptane pan

polymerics



Testing the accuracy of flow calculation programs as per UL 2166







The fire protection solutions







Safety Hi-Tech is an active member of:

- ▶ NFPA 2001: Technical Committee Member since 1993
- UNI: Member of Working Group on Special Fire Extinguishing Agents
- ► CEN: Italian Expert at Task Groups of CEN/TC 191 WG/6 Technical Committee 191 "Fixed firefighting systems"/Working Group 6 "Gas extinguishing systems and components"
- ▶ ISO: Italian Expert at Working Groups of ISO/TC 21/SC 8 Technical Committee 21 "Equipment for fire protection and firefighting"/Subcommittee 8 "Gaseous and firefighting systems using gas"
- ► HTOC: Member of Halons Technical Options Committee (HTOC), one of the specific Technical Options Committees of TEAP (Technology and Economic Assessment Panel).



NAF® S 1230, NAF® S 125 and NAF® S 227 fire suppressants:

- ► UL Recognized (UR)
- US EPA Approved











Why do we use NAFS Agents?

.... because they are:

- / 100% volatile
- non-conductive
- safe for use in manned areas
 - year-round protection



.... Where?



Computer Rooms



Control Rooms



Telecommunication Facilities



Clean Rooms



Archives



Museums



Laboratories



Machinery Spaces





Physical properties

Agent	Molecular weight	Boiling point (°C)	Vapor pressure @ 20°C (bar)
Halon 1301	148,93	-58,0	13,72
NAF S 125	120,02	-48,5	13,71
NAF S 227	170,04	-16,4	4,57
NAF S 1230	316,04	+49,2	0,326



Design concentration % v/v

	DC (NFPA)					
	NAF \$1230		NAF S 125		NAF S 227	
CLASS FIRE	%	kg/m³	%	kg/m³	%	kg/m³
Α	4,50	0,655	8,7	0,484	6,6	0,516
В	5,85	0,865	11,3	0,648	8,6	0,687
С	4,50	0,655	9,0	0,502	7,0	0,550

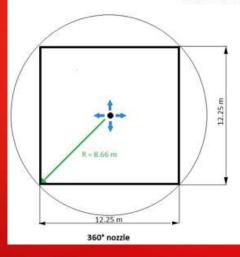


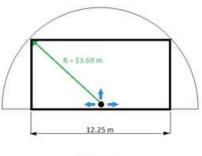
Nozzle area coverage

Discharge Nozzles

2500	1000	
19797.70	180°	
1/2", 3/4", 1", 1	1 1/4", 1 1/2", 2"	
(15, 20, 25, 32, 40, 50 mm)		
4, 5, 6.5, 9,	10, 13 mm	
24	18	
12.25m x 12.25m = 150 m ²		
4.115 m		
0.40 m		
0.3	0.3	
	0.3	
5.65	bar	
	4, 5, 6.5, 9, 24 12.25m x 12. 4.1: 0.4 0.3	

Nozzle Area Coverage





180° nozzle



Approvals:

- ▶ UL Listed (ref. standard: NFPA 2001/UL 2166)
- CE marked by LPCB-UK (ref. Standard: EN 12094)
- DNV approved for marine uses (ref. standard: IMO MSC Circ. 848 and MSC.1 Circ.1 267)





Certified to EN 12094-4, -8, -13 LPCB Ref. No. 969a









System components:

- 4 discharge valves
- hoses and non-return valves
- manual and electric actuators
- pneumatic connections for multiple cylinders
- nozzles
- seamless and welded cylinders from 5 to 240 LT





Basic Cylinder Assemblies (5 to 240 LT)

All **BCAs** include seamless and welded cylinder, valve, flange, dip tube and a set of labels. These unit assemblies combined with accessories and pneumatic components can be used for modular (one cylinder) or centralized (multiple cylinder) systems.





Accessories:

- electrical and manual actuators
- hoses
- non-return valves
- nozzles (180° and 360° from ½" to 2")
- pneumatic items for multiple cylinder systems







Range of seamless cylinders - 42 bar wp						
Capacity	NAF S 125		NAF \$ 227		NAF S 1230	
(LT)	min. (kg)	max. (kg)	min. (kg)	max. (kg)	min. (kg)	max. (kg)
5,0	2,5	4,0	2,5	5,5	1,5	5,5
13,4	6,5	12,0	6,5	15,0	3,5	15,0
26,8	13,0	24,5	13,0	30,5	6,5	30,0
40,2	19,5	37,0	19,5	46,0	10,0	45,0
67,5	32,5	62,0	32,5	77,0	16,5	75,5
75,0	36,5	69,5	36,5	86,0	18,0	84,0
100,0	48,5	93,0	48,5	115,0	24,0	112,0
120,0	58,0	111,5	58,0	138,0	29,0	134,5





Range of welded cylinders - 25 bar wp NAF S 125 NAF S 227 NAF S 1230 Capacity (LT) min. (kg) max. (kg) min. (kg) max. (kg) min. (kg) max. (kg) 175,0 84,5 162,5 84,5 201,0 42,0 196,0 240,0 115,5 223,0 115,5 276,0 58,0 269,0

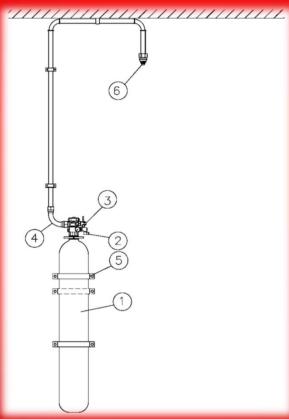




Range of seamless cylinders - 60 bar wp			
NAF S 1230		5 1230	
Capacity (LT)	min. (kg)	max. (kg)	
140,0	34,0	156,5	
160,0	38,5	179,0	
180,0	43,5	201,5	

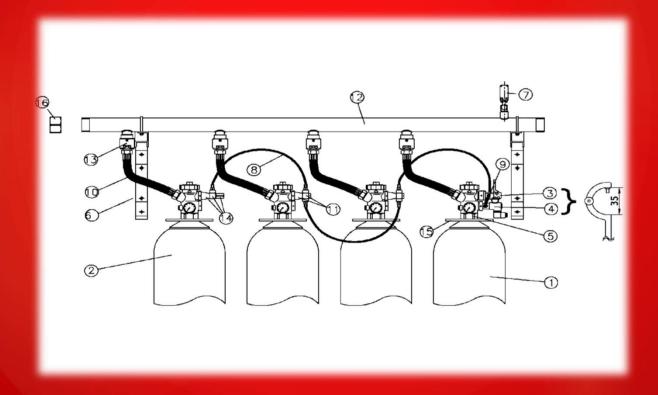


42 bar single cylinder system



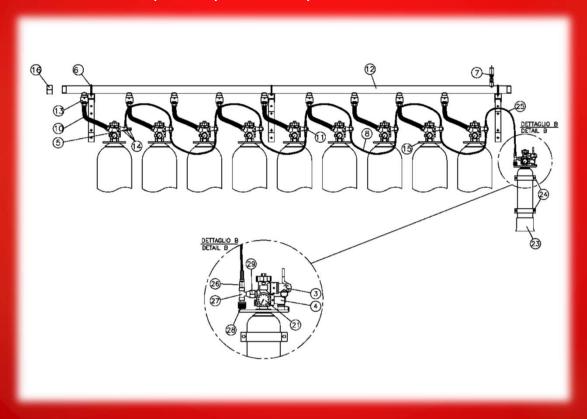


42 bar multiple cylinder system



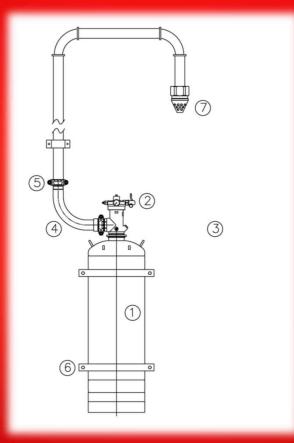


42 bar multiple cylinder system with more than 8 cylinders



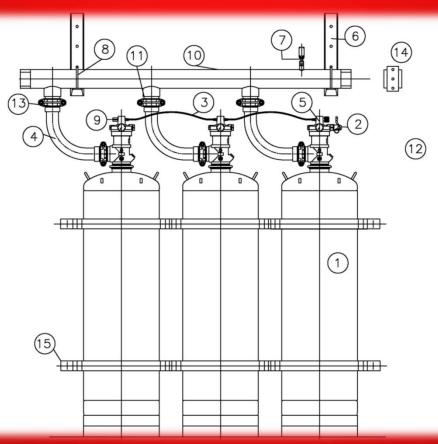


25 bar single cylinder system



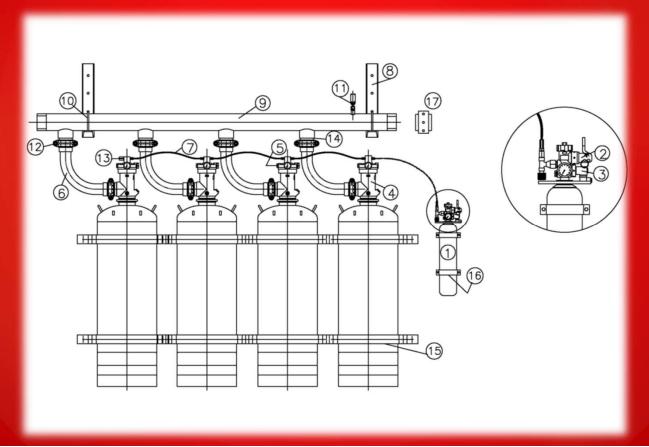


25 bar multiple cylinder system





25 bar multiple cylinder systems with more than 3 cylinders





UI online certification directory

ONLINE CERTIFICATIONS DIRECTORY

GAQF.EX6264 Clean Agent Extinguishing System Units

Page Bottom

Clean Agent Extinguishing System Units

ee General Information for Clean Agent Extinguishing System Units

AFETY HI-TECH SRL

EX6264

VIA CAVOUR 96

7051 AVEZZANO, AO ITALY

NGINEERED UNITS, NAF S 125 (HFC-125 with limonene additive, 0.15% by weight) Clean Agent Extinguishing System Units, stored pressure pe, having nominal charging capacities of 5, 13.4, 26.8, 40.2, 67.5, 75, 100 and 120 L. The units are super pressurized to 42 bar at 21°C with perating temperatures of -18 °C to +50 °C. The units are designed for total flooding protection against Class A surface burning, Class B mable liquid and Class C fires occurring within an enclosure.

scription of these extinguishing system units and the design and installation limitations are contained in the Listee's installation manual P/N HIM125227 rev. 00 dated July 2013 and design manual P/N SHDM125 dated February 2013. These installations require the use of the Listee's ow calculation software NAF S 125 Flow Calculation Program Version SHT 3.72 dated May 2005 floppy disc or CD accessed through Safety Hisch, User's Manual SHT Flowcalc-NAF S 125. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (kg)	Part No.
2.5-4.0	**70025410
6.5-12.5	**70025409
13.0-24.5	**70025408
19.5-37.0	**70025407
32.5-62.0	**70025412
36.0-70.5	**70025405
48.5-93.0	**70025404
58.0-111.5	**70025403

Note that the part numbers shown may have a 2-digit alphanumeric prefix

NGINEERED UNITS, NAF S 125 (HFC-125 with limonene additive, 0.15% by weight) Clean Agent Extinguishing System Units, stored pressure pe, having nominal charging capacities of 142, 175 and 240 L. The units are super pressurized to 25 bar at 21°C with operating temperatures 1-18 °C to +50 °C. The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C es occurring within an enclosure.

description of these extinguishing system units and the design and installation limitations are contained in the Listee's installation manual P/N MH1252277 rev. 00 dated July 2013 and design manual P/N SH04125 dated February 2013. These installations require the use of the Listee's calculation software NAF 5 125 Few Calculation Program Version SHT 3.72 dated May 2005 Roppy disc or CD accessed through Safety Hi



Loss Prevention Certification Board



This is to certify

Safety Hi-Tech srl Via Cavour, 96-67051 Avezzano (AQ), Italy

is authorised to use the LPCB mark in association with the product(s) listed in this certificate and appendix.

NAF S 125 & NAF S 227 Fire Fighting Components

which have complied with schedules of requirements based on parts of the following:

> EN12094 - Fixed firefighting systems components for gas extinguishing systems

EN 12094 - Part 4: Requirements and test methods for container valve assemblies and their actuators

EN 12094 - Part 8: Requirements and test methods for connectors EN 12094 - Part 13: Requirements and test methods for check valves and non-return valves

Certificate No. 969a

Issue No. 02

Date of Issue 04 May 2011

Signed on behalf of LPCB



M A Chaplin

LPCB is part of BRE Global Ltd., Garston, Wasford WD25 SIXX, Tell +44 (I))1923 654100
Fax +44 (I))1923 66400 www.RedBookLive.com
This certificate remains the property of BRE Global Ltd., and is issued subject to terms and conditions and is manifested and held in force Prough regular survivalnos activities.

Loss Prevention Certification Board APPENDIX TO CERTIFICATE NO. 969a Safety Hi-Tech srl NAF S 125 & NAF S 227 Fixed Gas System Components This strap of equipment is suitable for stratege from -SQC to SQC (NAS 5 125) or 0 to 50°C (NAS 5 277). This strap of equipment is apprised for some computation was folding for Total Design Manuars PRHS ERGADADS 6 EHCAMS2ZPEN, and Installation, Maintenance and User Manual PRH SHIMMAYSWI, mych. NAS 5 125 6 May 5 27 are supplied to contained at 42 are 2 1°C. NAF S 125 & NAF S 227 Container valves Signed on behalf of LPCB Page 2 of 3 Date of Issue 04 May 2011 Issue No. 02 LPCB is part of BRE Global Ltd., Garston, Watford WD25 90K. Tel +44 (0)1923 664100
Fax +44 (0)1923 664003 www.RedBookLive.com
This certificate remains the propenty of BRE (blobal Ltd and a issue subject to terms and condit





DNV-GL Certificate No: MEDB000039B

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of Norway.

This is to certify:

That the Equivalent fixed gas fire extinguishing systems components (extinguishing medium, head valves and nozzles) for machinery spaces and cargo pump rooms

with type designation(s)

NAF S 227 Fire Extinguishing System

SAFETY HI-TECH SRL Formello RM, Italy

is found to comply with the requirements in the following Regulations/Standards:

Regulation (EU) 2017/306,

item No. MED/3.45. SOLAS 74 as amended Regulation II-2/10 & X/3, IMO MSC/Circ. 848, IMO MSC.1/Circ.1313, IMO MSC.1/Circ.1316, FSS Code 5 and 2000 HSC Code 7

Further details of the equipment and conditions for certification are given overleaf

This Cortificate is valid until 2022-11-27

Issued at Høvik on 2017-11-28

DNV GL local station: Naples

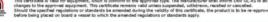


Notified Body

Vidar Dolonen **Head of Notified Body**

for DNV GL AS

The mark of conformity may only be affixed to the above type approved equipment and a Hanufacturer's Declaration of Conformity issued when the production-correlation conduct, by a vertice of the HID is fully complete with and controlled by a vertice production of the HID is the complete with and controlled by a vertice production of the HID is the conformity of the HID is the conformity of the HID is the Conformity of the HID is the HID





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UL VALIDATED DESIGN PROGRAMS

sht 4,00 flow calculation program



Safety Hi-Tech Flow Calculation Software v4.00 (NAF S 227) UL: EX6264

File Name: 140374.2.FC4

Consolidated Report

Customer Information

Company Name: Formula Techniki

Address:

Phone: Contact: Title:

Project Data

Project Name: Book shelves

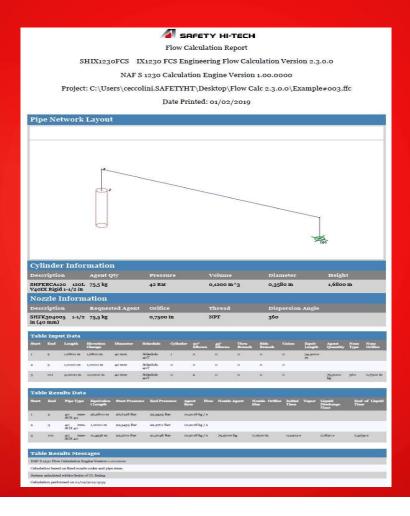
Designer:

Number: 140374.2

Account: Location: Description:



UL VALIDATED DESIGN PROGRAMS





UL REVIEWED MANUALS



NAF S 125® Engineered Systems

Design Manual

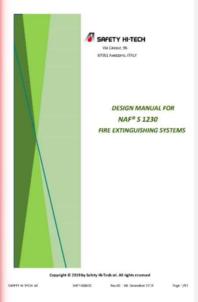
Author	Approved by	Rev. Date
Giuliano Indovino	Maurizio Barbuzzi	February 2014



NAF S 227® Engineered Systems Design Manual

Author	Approved by	Rev. Date	
Giuliano Indovino	Maurizio Barbuzzi	February 2014	





Safety HI-Tech S.r.L. UL EX6264 Rev. February 2014

SAFETY HI-TECH S.F.L.

Rev. February 2

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UL REVIEWED MANUALS



INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR

NAF S® 1230

ENGINEERED FIRE EXTINGUISHING SYSTEMS

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SHTFKIOM00

Rev.02

08/01/201

Pag. 1/148



UL 2166

Agent testing – determines the extinguishing concentrations.

Nozzle area coverage – determines the maximum coverage of nozzles, the minimum average nozzle pressure and the minimum working temperature of the system.

- Validation of flow calculation method validates the accuracy of the flow calculation program, which is one of the most critical aspects of systems design.
- System component testing tests the reliability of each component (valves, hoses, cylinders, check valves, actuators, nozzles, etc.).
 - Agent component recognition confirms the quality and origin of the extinguishing agent.

Review of manuals – UL reviews the information and data contained in the design and installation manuals to make that systems are properly designed and installed.



UL AML



FOLLOW-UP SERVICE PROCEDURE (TYPE R)

CLEAN AGENT EXTINGUISHING SYSTEM UNITS

(GAQF) Complementary Product Category CLEAN AGENT EXTINGUISHING SYSTEM UNITS (GAOPC)

Manufacturer: SEE ADDENDUM FOR MANUFACTURING LOCATIONS

VIA CAVOUR 96 67051 AVEZZANO AQ ITALY

Listee: SAME AS APPLICANT (122335-002)

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Stephen Hewson Senior Vice President Global Follow-Up Service Operations

William R. Carney Director North American Certification Program

Issued: 2005-07-22 File EX6264 Vol 3 Addendum To Page 1 Authorisation Page Revised: 2013-04-26

LOCATION

1873056 (Party Site) (100528-849)

EVERSAFE EXTINGUISHER SDN BHD

LOT 878

JALAN SUBANG 9

TAMAN PERINDUSTRIAN SUBANG

DARUL EHSAN

47500 SUBANG JAYA SELANGOR MALAYSIA

Factory ID:

UL Contracting Party for above site is: UL AG

2364917 (Party Site)

AL ARABIA SAFETY & SECURITY L L C (100549+659)

JUMA AL-MAJID WAREHOUSES AL KHABEESI AREA

DEIRA

DUBAI UNITED ARAB EMIRATES

ALARABIA Factory ID:

UL Contracting Party for above site is: UL AG

2605170 (Party Site)

(100561-616) ARABIAN CONSTRUCTION CO W L L ST 8/12

SHUWAIKH INDUSTRIAL BLK 68

PO BOX 176

13002 SAFAT KUWAIT

Factory ID:

UL Contracting Party for above site is: UL AG

2623119 (Party Site) (100564-746)

BAVARIA EGYPT S A E CENTRAL MGT BLK 109

GISR EL SUEZ ST HELIOPOLIS INDUSTRIAL

CAIRO EGYPT

Bavaria

Factory ID: UL Contracting Party for above site is: UL AG



THANK YOU!

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GIU.INDOVINO@SAFETYHITECH.COM

