STEP CHANGE IN SAFETY

Respiratory Protective Equipment 101

George Elliott

Northern Europe Region Application Engineering Supervisor

3M

3M Science. Applied to Life.™

What you breathe matters.
Choose wisely.

Breathe Easy: Respiratory Protective Equipment Fundamentals

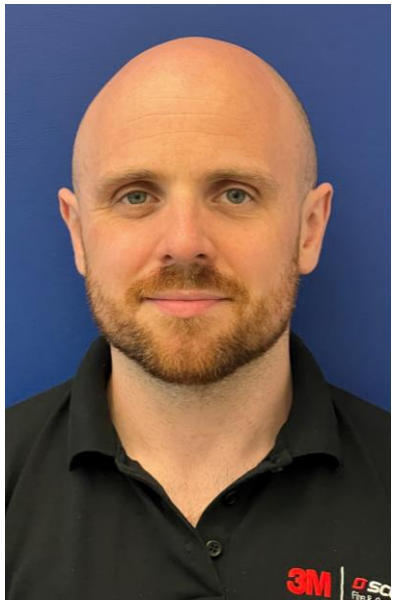
Step Change

George Elliott

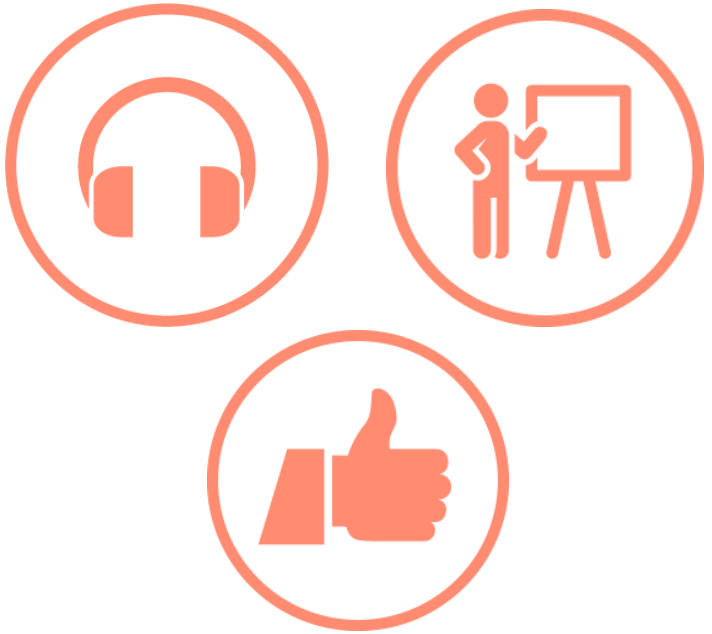
07/11/2024

Thank you for joining me today

George Elliott



Senior Application Engineer
3M Personal Safety Division UK&I



Supporting customers with expert technical information and training at a local level.

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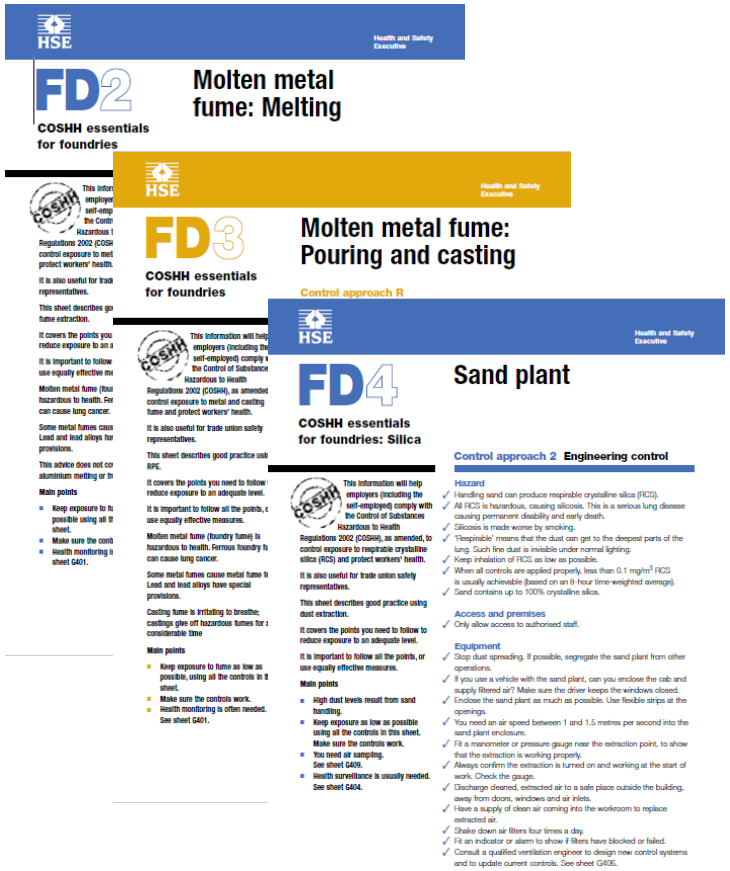
Before I begin…

Thank you!

1. **Detect** hazards in the air
2. **Select** proper solution
3. **Protect** – how to protect properly

Detect

HSE COSHH Essentials



FD2

Molten metal fume: Melting

COSHH essentials for foundries

FD3

Molten metal fume: Pouring and casting

COSHH essentials for foundries

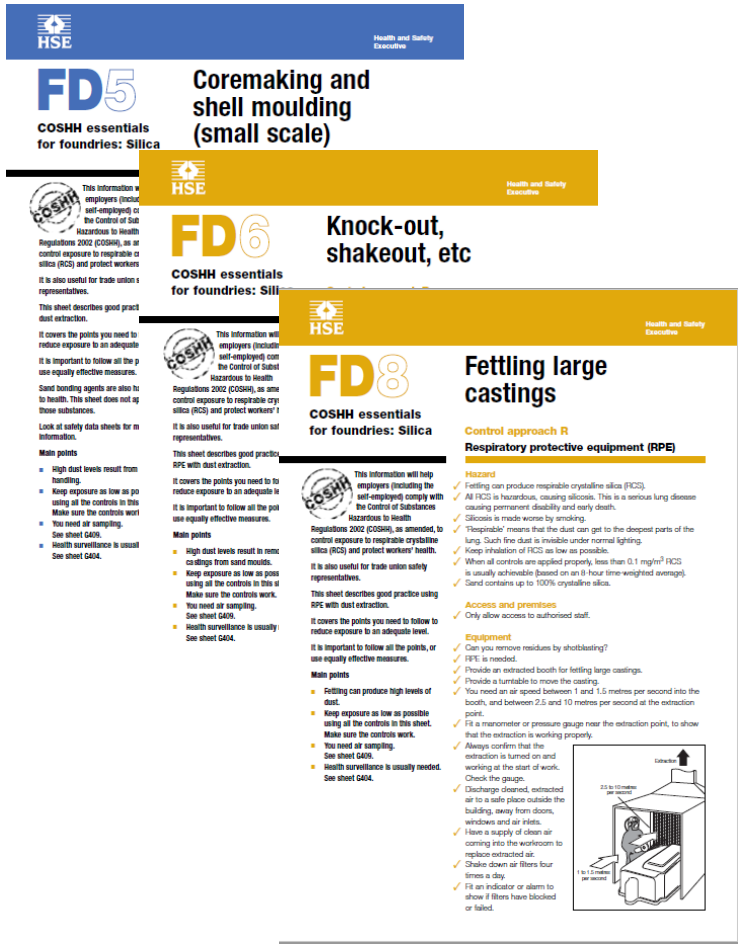
Control approach R

FD4

Sand plant

COSHH essentials for foundries: Silica

Control approach 2 Engineering control



FD5

Coremaking and shell moulding (small scale)

COSHH essentials for foundries: Silica

FD6

Knock-out, shakeout, etc

COSHH essentials for foundries: Silica

FD8

Fettling large castings

COSHH essentials for foundries: Silica

Control approach R

Respiratory protective equipment (RPE)

FD11

Pattern assembly (investment casting)

COSHH essentials for foundries

FD12

Spray coating a large casting (open workshop)

COSHH essentials for foundries

FD14

Furnace relining

COSHH essentials for foundries: Silica

Control approach R

Respiratory protective equipment (RPE)

What makes the solution adequate?

TYPE
of the hazard

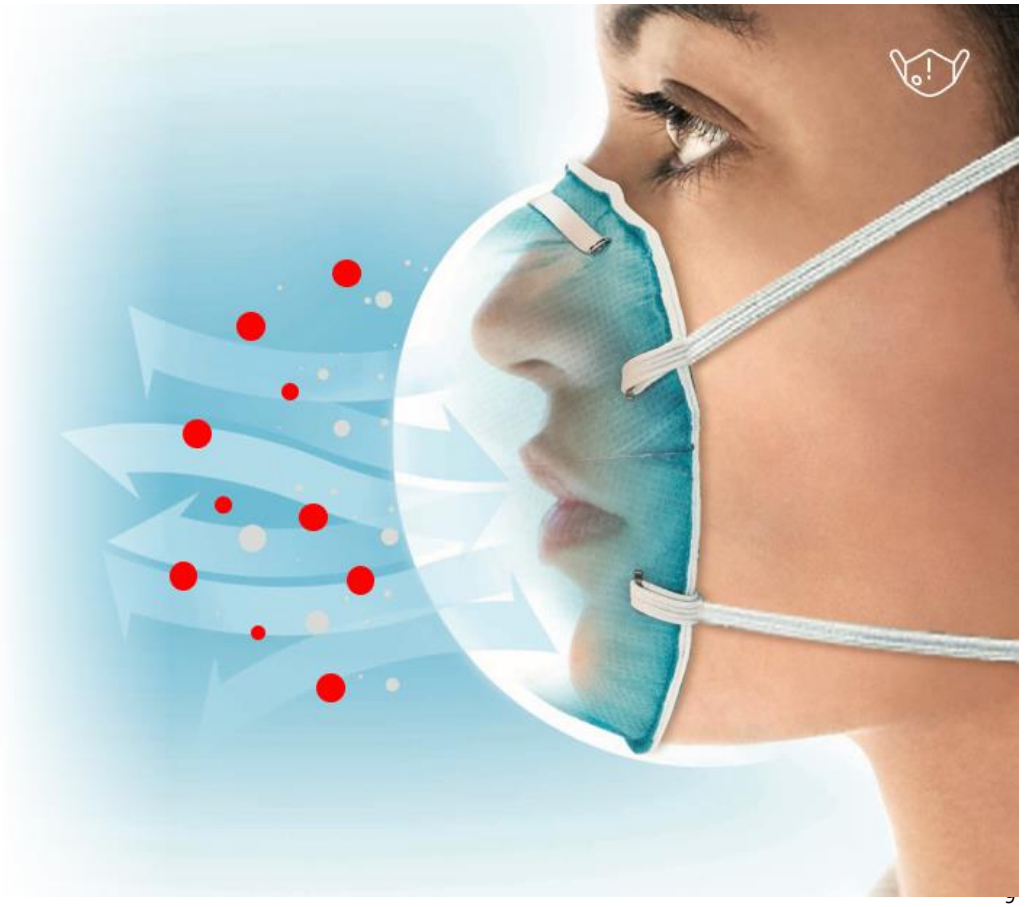
&

CONCENTRATION

Particulates

Gases &
Vapours

Oxygen
deficiency



Workplace Exposure Monitoring

PREPARE

Identify contaminants (e.g. MSDS) – N.B. Gases & vapours only

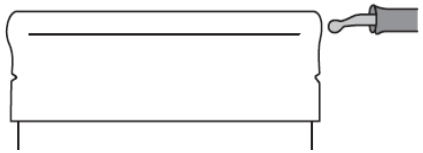
Select appropriate monitoring methods

Design a sampling strategy, e.g. group workers with similar exposure, consider number of samples needed

SAMPLE

Sample

Stop

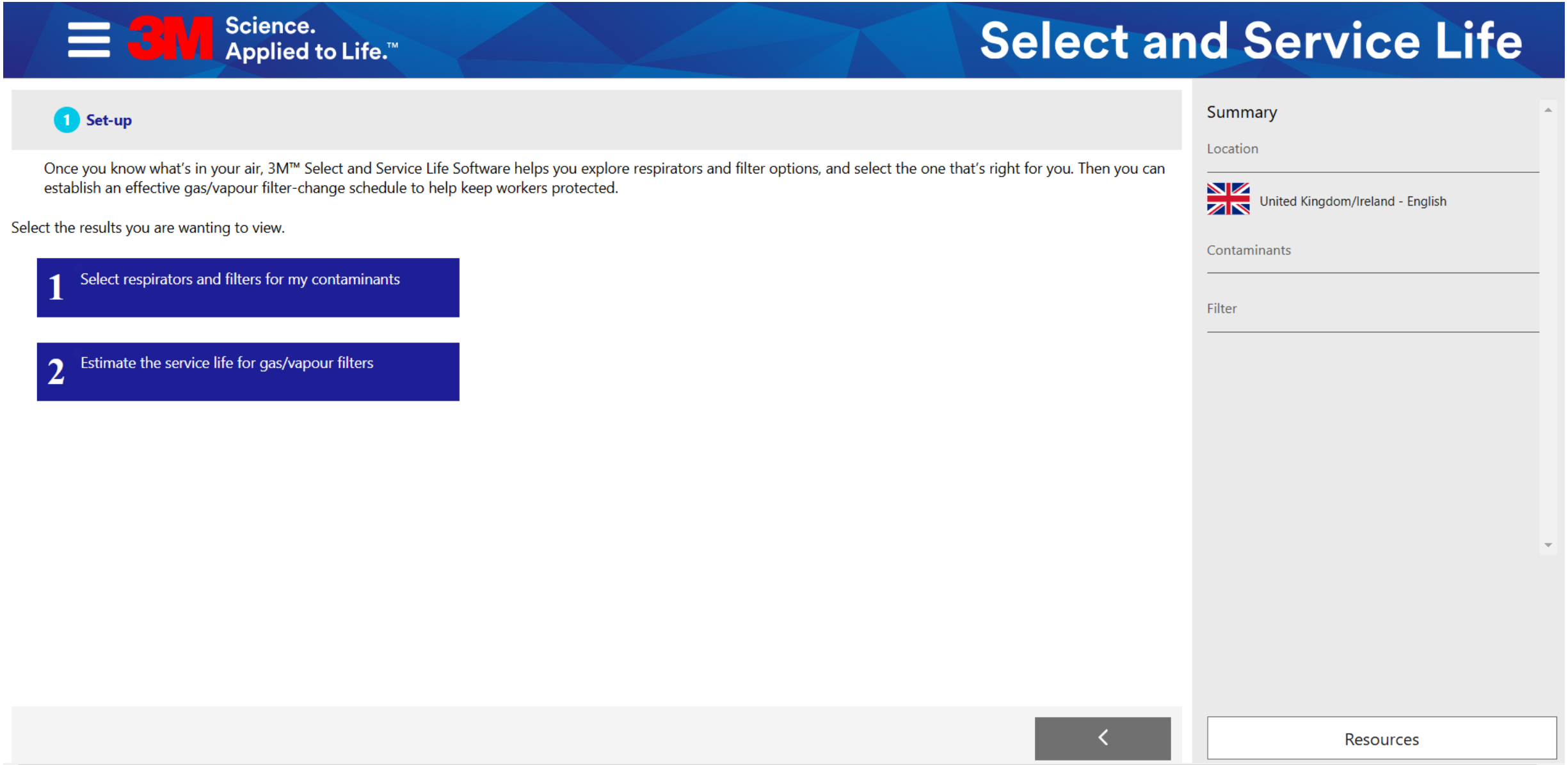


Pack

ANALYSE

Send to analytical services provider

I have concentration data, what can I now do with it?



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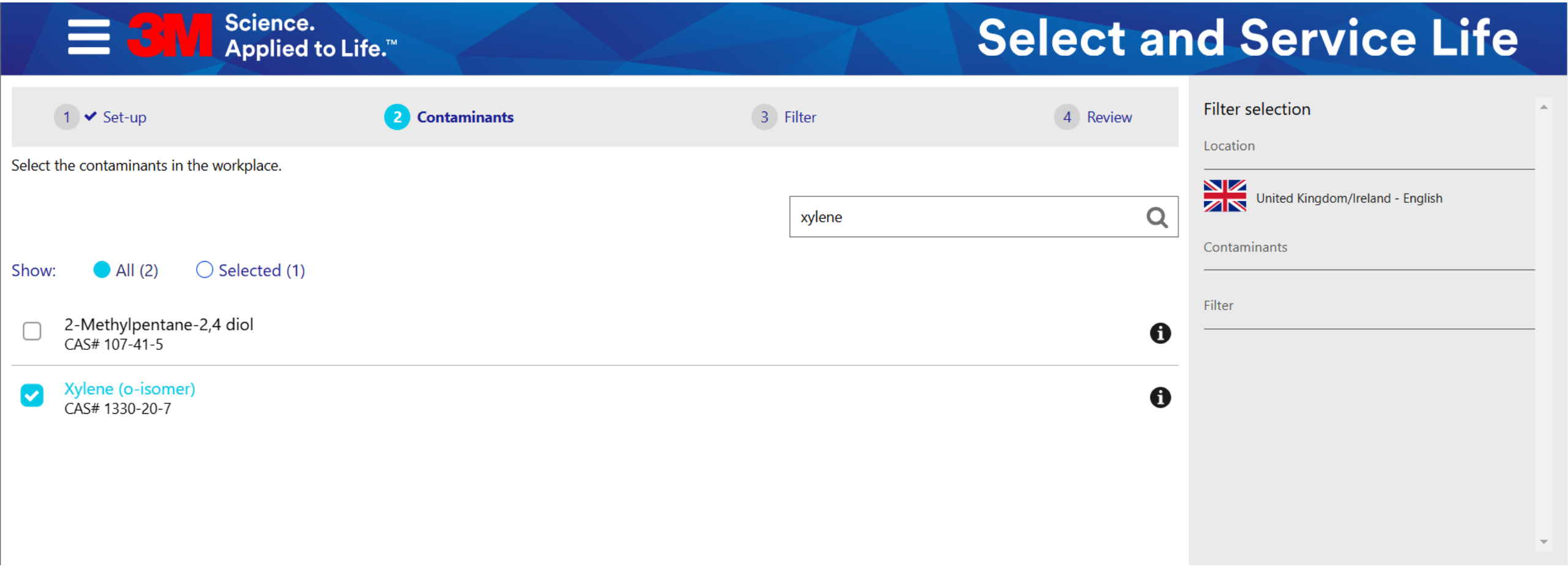

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Select and Service Life

Science. Applied to Life.™

1 ✔ Set-up 2 ✔ Contaminants 3 Filter 4 Review

Below are the filter solutions for the contaminants that you previously entered. Select the solution(s) that work best for your workplace.

Refine results

Search by Name

4251+
3M™ Maintenance Free Half Mask, FFA1P2 R D Filters, 4251+

4255+
3M™ Maintenance Free Half Mask, FFA2P3 R D Filters, 4255+

4277+
3M™ Maintenance Free Half Mask, FFABE1P3 R D Filters, 4277+

4279+
3M™ Maintenance Free Half Mask, FFABEK1P3 R D Filters, 4279+

6051
3M™ A1 Gas and Vapour Filters 6051

6055
3M™ A2 Gas and Vapour Filters 6055

6057
3M™ ABE1 Gas and Vapour Filters 6057

6059
3M™ ABEK1 Gas and Vapour Filters 6059

6075
3M™ Formaldehyde + A1 Gas and Vapour Filters 6075

D8051 D8055 D8059

Filter selection

Location

United Kingdom/Ireland - English

Contaminants

Xylene (o-isomer)

Filter

Resources

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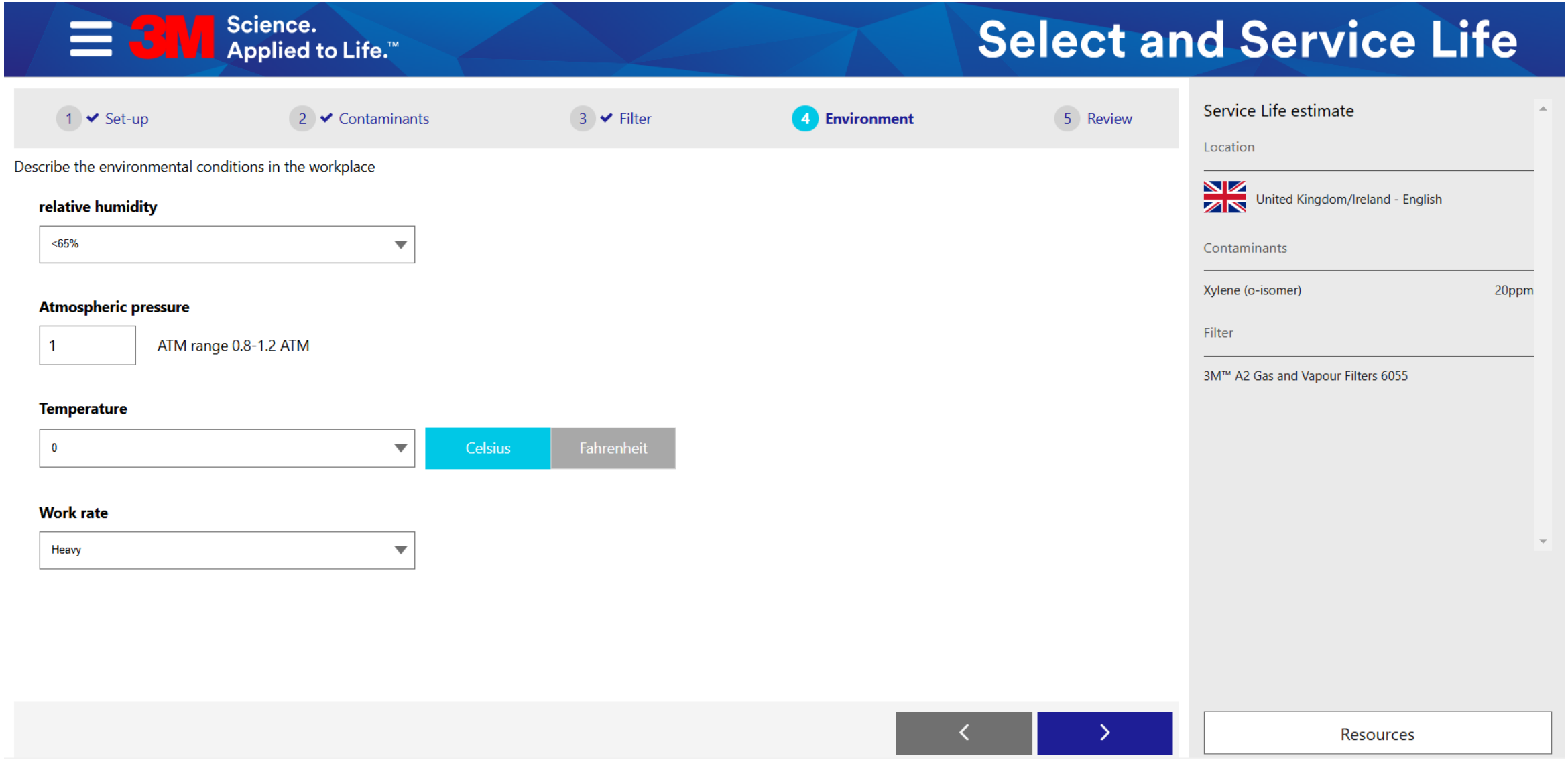

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Select and Service Life

Science. Applied to Life.™

1 ✔ Set-up 2 ✔ Contaminants 3 ✔ Filter 4 ✔ Environment 5 Review

Review your selections

3M™ A2 Gas and Vapour Filters 6055

3M™ A2 Gas and Vapour Filters 6055 protect against organic vapours with boiling points above 65°C. Suitable for use with all 3M half and full face masks.

155 hours
Service Life estimate

Service Life estimate: 155 hours until breakthrough to 10 ppm
Based on environmental conditions: relative humidity <65%, 1 ATM, 20°C, Moderate Work , Xylene (o-isomer) (20ppm)

* The values generated by the software are estimates only. For example, the math model used to estimate organic vapor service life at <65% RH may have uncertainty of ± 50%.

Warnings

- Your estimated service life is greater than 8 hours. Please see information on contaminant migration through the filter in the Help document.
- The selected chemical is a mixture. Calculations are based on its primary component.
- Service life is based on an organic vapour which can migrate through the filter during storage. Please consider the estimated service life as time from first use.

Selected contaminants

Xylene (o-isomer)

Exposure Entered: 20ppm

Service Life estimate

Location

United Kingdom/Ireland - English

Contaminants

Xylene (o-isomer)	20ppm

Filter

3M™ A2 Gas and Vapour Filters 6055

Environment

relative humidity	<65%
Atmospheric pressure	1
Temperature	20 Celsius
Work rate	Medium

Generate PDF

www.3M.com/SLS

Select

Respiratory Selection

Adequate

It is right for the hazard and reduces exposure to the level required to help protect the wearer’s health

Suitable

It is right for the wearer, task and environment


Select
adequate
respirator
3M

What makes the solution adequate?

TYPE
of the hazard

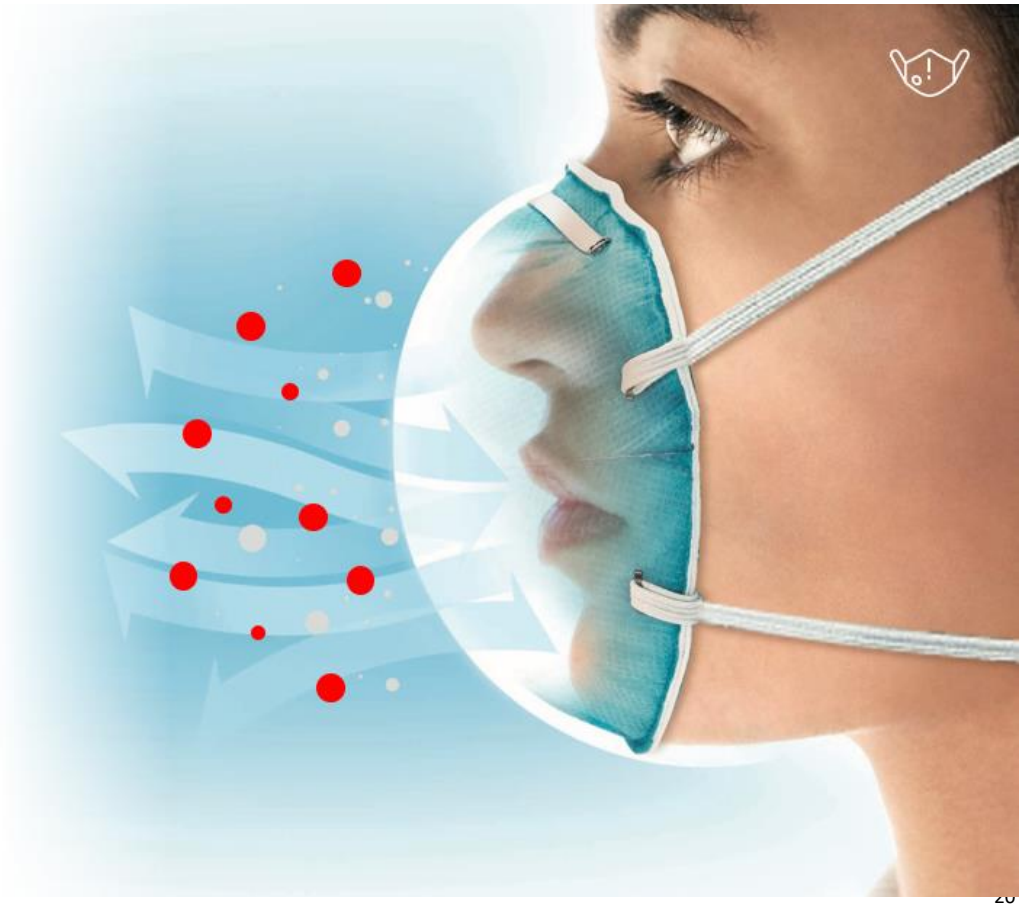
&

CONCENTRATION

Particulates

Gases &
Vapours

Oxygen
deficiency



Adequate to the type of hazard

Particulates

Particulate filter

Disposable Respirators

Gases & Vapours

Gas filter

Oxygen deficiency

NO filtration - SCBA & Fire

UK Assigned Protection Factors (HSG 53)

Increasing protection factor

APF 2000	Pressure demand valve breathing apparatus
APF 40	PAPR and Supplied air hoods, helmets and full facepieces (TM3/TH3)
APF 40*	Negative demand full facepieces +P3
APF 20*	Negative demand half facepieces +P3
APF 20*	Filtering facepieces FFP3

*Focuses on maximum particulate protection only, APFs may vary for Gas & Vapour protection

Tight Fitting Respiratory Protection

Disposable respirators

Particulate hazards
FFP1, FFP2, FFP3
Short tasks < 1 hour
Face fit testing and wearers clean shaven

Half / Full face mask

Particulates, gas & vapours
Short tasks < 1 hour
Face fit testing and wearers clean shaven
Selection of models and sizes
Maintenance/record keeping

Powered and Supplied Air Respiratory Protection

P&SA with with headtops

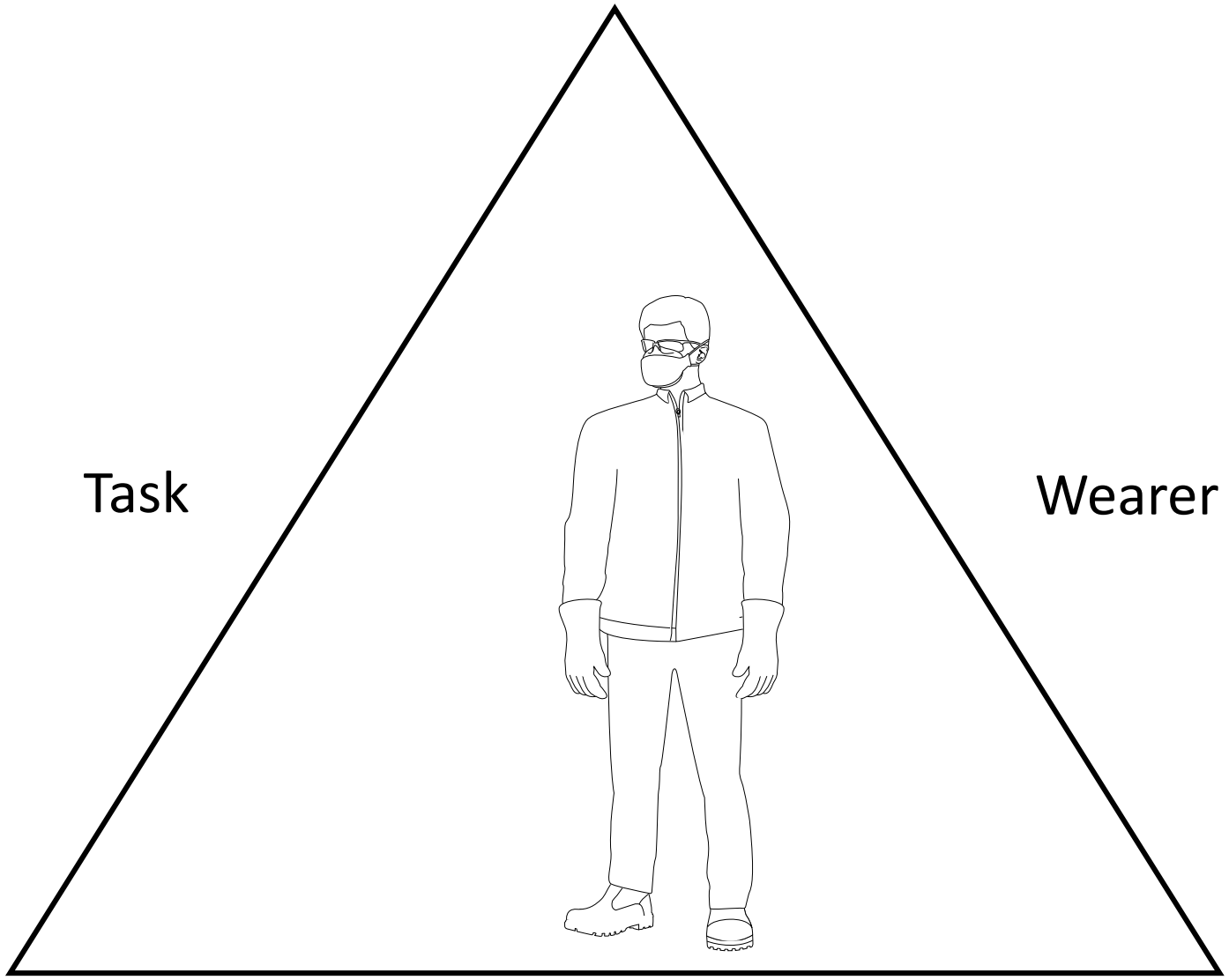
Particulates, gas & vapours
Longer tasks > 1 hour
Selection of headtops and hoods
No face fit test required
Maintenance/record keeping

P&SA with face masks

Particulates, gas & vapours
Longer tasks > 1 hour
Full face and half mask
Facefit testing required
Maintenance/record keeping


Select
suitable
respirator

Suitability



PPE Compatibility – another factor of suitability

+

=

Integrated PPE

The connection between eye, face, head and respiratory protection

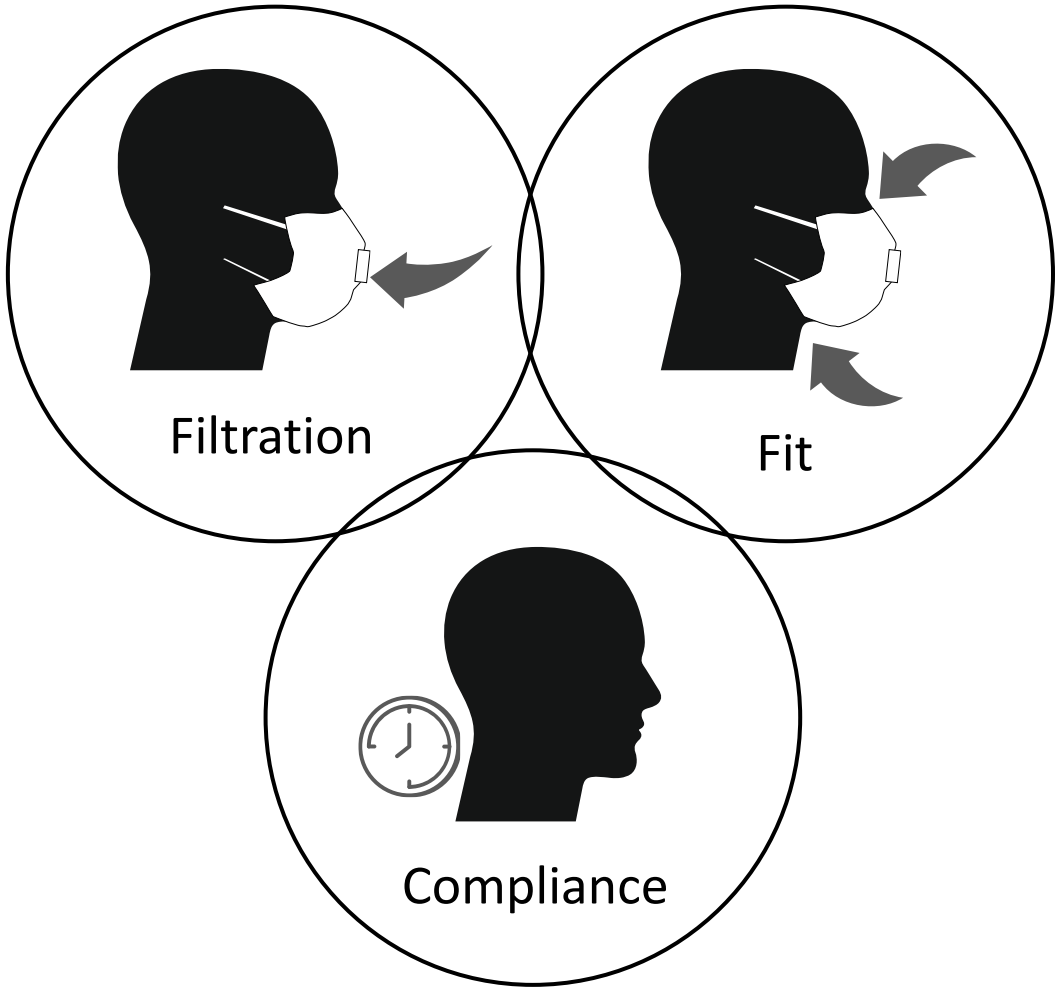
Encapsulated vs non encapsulated

Suitability Considerations

- Their health: medical evaluation and surveillance
- Facial hair
- Need for corrective spectacles
- Comfort
- Suitable fit
- Additional requirements e.g. headwear
- Their work-rate
- The time they may have to wear the PPE
- Requirements for communication
- Mobility

Protection

Tight-fitting RPE performance




Any tight-fitting facepiece should be fit tested


Any tight-fitting facepiece should be fit tested

Any tight-fitting facepiece should be fit tested

Including powered devices

Any tight-fitting facepiece should be fit tested

Including SCBA

Filters and cartridges

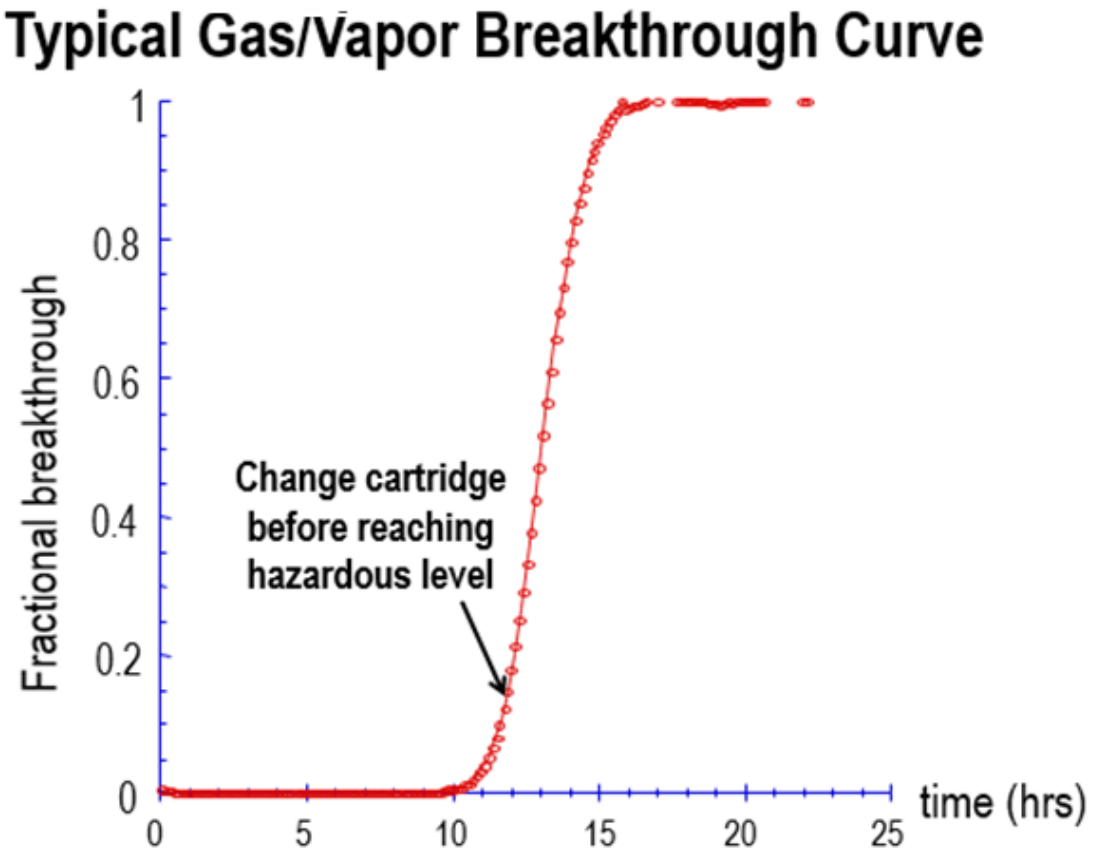
When should they be changed?

When to change particle filters

<u>Change filter if:</u>

- Dirty
- Damaged
- Increased breathing resistance
- PAPR failing flow rate check
- If EN single use: maximum 8 hours

How Long Do They Last?

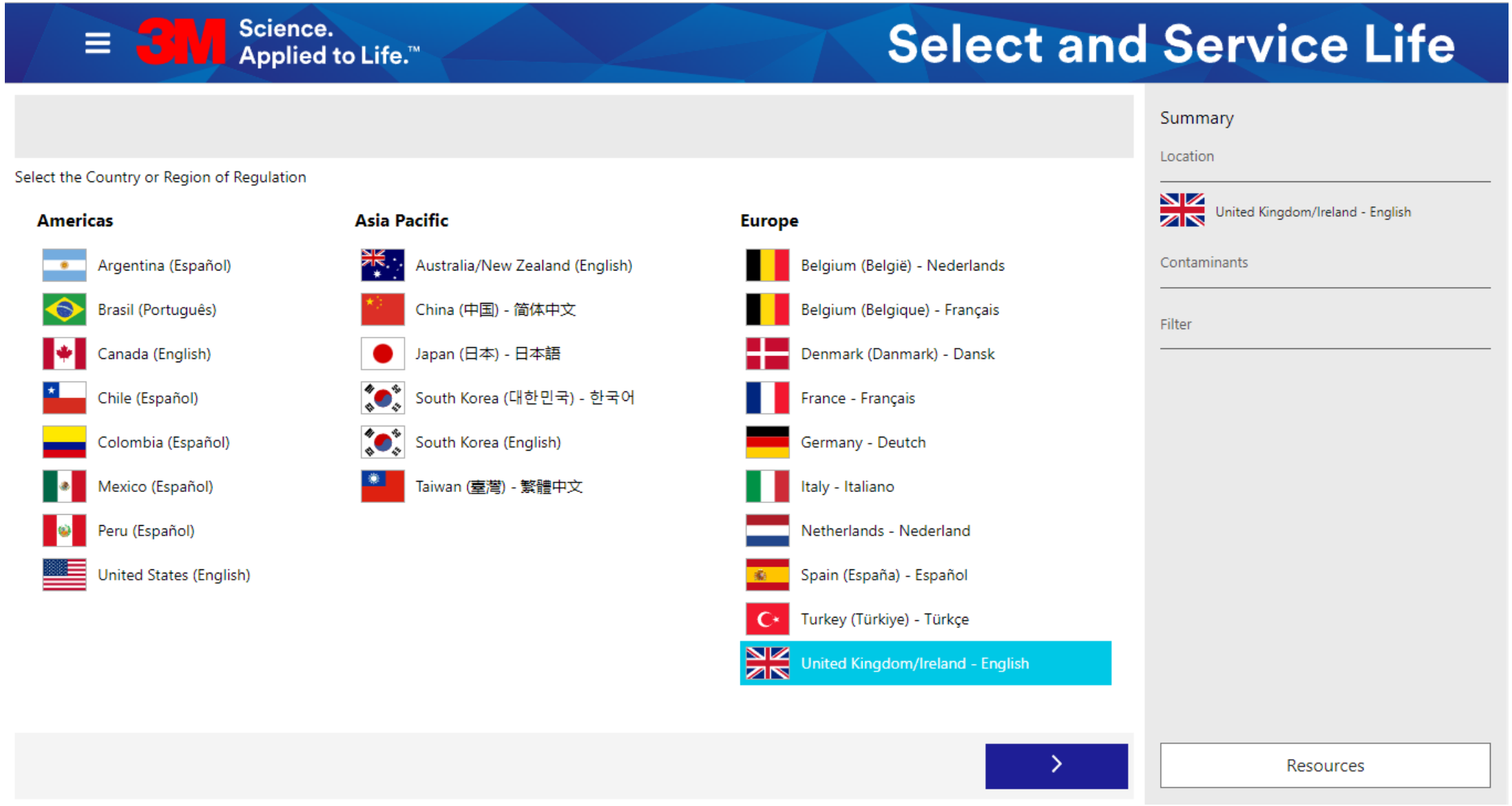


Cartridge Service Life

Depends on several factors, such as:

- Carbon characteristics
- Contaminant(s)
- Concentration
- Airflow (breathing rate)
- Temperature
- Relative humidity
- Migration

Service Life Software



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Care and Maintenance

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Care and Maintenance

3M™ Versaflo™ TR-600 Powered Air-Respi

To maintain protection levels, optimise the effective lifetime of the system and avoid the additional cost of replacer
it is extremely important to carry out regular checks and maintenance on Powered and Supplied Air Respirators.

Battery
- Should be immediately charged after receipt of product

Before use
- Ensure Battery is fully charged
- Ensure Turbo is undamaged
- Ensure Turbo is correctly secured to its belt
- Ensure Filter is correctly fitted
- Perform airflow check -insert Airflow Indicator Tube. Refer to Turbo user instructions for information
- Perform alarm check. Refer to Turbo user instructions for information

Monthly
- Carry out all the 'Before Use' inspections and create a record of this monthly check for the turbo

After use
- Clean with cloth dampened with a mild solution of water and liquid household soap
- Turbo may also be worn through a shower to remove further contaminant
- Turbo can also be immersed for cleaning or put in respirator washer for cleaning (using TR-653 Cleaning & Storage Kit)
- Battery can be immersed for cleaning
- Refer to user instructions for cleaning information
- Charge Battery (if required)
- Change Spark Arrestor, Pre-Filter and/or Filter (if required)
- Store in a dry, clean area/locker away from direct sunlight, high temperature and solvents

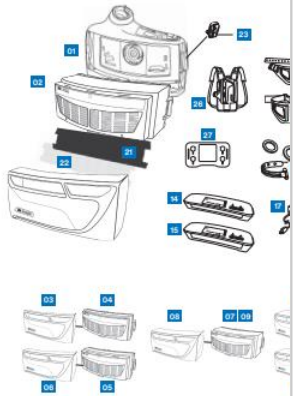
Every filter change
- Inspect Filter and inner seal and replace if damaged
- Always properly install the Filter into the Turbo

Ordering consumables, repair parts and accessories

To request a quote or place an order for these items, please contact your 3M Approved Distributor.

Further information and advice

If you require additional guidance on the Care and Maintenance of your 3M Powered and Supplied Air Equipment, please contact the Helpline or your local 3M representative.



Replace all damaged parts immed
to ensure correct levels of protect

To download this poster please visit:
www.3M.co.uk/maintenancepack

3M Personal Safety Division
3M United Kingdom plc
3M Centre, Cain Road
Bracknell, Berkshire RG12 8HT
Tel: 0870 60 800 60
www.3M.co.uk/safety

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Care and Maintenance

3M™ Versaflo™ M-400 Series Helmets

To maintain protection levels, optimise the effective lifetime of the system and avoid the additional cost of replacement, it is extremely important to carry out regular checks and maintenance.

Before Use
- Inspect for damage and replace if necessary:
  - Outer shroud – ensure it is free from tears and its gasket is inserted properly
  - Inner collar
  - Visor frame to jaw gasket
  - Visor - surround and gasket
  - Helmet shell
  - Forehead seal
  - Head harness
  - Comfort pad/s
- Replace Peel Off visor covers (if used).

Monthly
- Carry out all the 'Before Use' inspections and create record of this monthly check.

After Use
- Clean with cloth dampened with a mild solution of water and liquid household soap.
- Disinfect with 3M 105 Wipes.
- Store in a dry, clean area / locker away from direct sunlight, high temperatures and solvents.

Ordering Consumables, Repair Parts and Accessories

To request a quote or place an order for these items, please contact your 3M Approved Distributor.

Further Information and Advice

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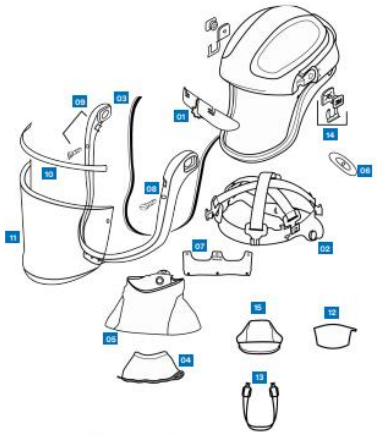

Replace all damaged parts immediately
to ensure correct levels of protection.

To download this poster please visit:
www.3M.co.uk/maintenancepack or
scan the QR code.

	Description	Part N°
	Versaflo M-406 Respiratory Helmet, with Coated Visor and High Durability Shroud	M-406
	Versaflo M-407 Respiratory Helmet, with Coated Visor and Flame Resistant Shroud	M-407
	Accessories and spare parts	
01	Replacement Airflow Deflector	M-316
02	Head Suspension	M-350
03	Jaw Gasket	M-441
04	Inner Collar	M-444
05	Flame Resistant Outer Shroud (M-407)	M-447
05	High Durability Outer Shroud (M-406)	M-448
06	Size Reducing Ratchet Comfort Pad	M-956
07	Forehead Comfort Pad	M-957
08	Visor Frame Buttons	M-919
09	Visor Frame Assembly	M-920
10	Visor Gasket	M-921
11	Molten Metal Visor	M-925
11	Coated Visor	M-927
12	Peel-Off Visor Covers	M-928
13	Chin Strap	M-958
14	Visor Pivot Kit	M-960
15	Flame Resistant Headtop Cover	M-972

3M Health & Safety Helpline
Monday - Friday 9 to 5
0870 60 800 60 - UK
1 800 320 500 - IRELAND

3M Personal Safety Division
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United Kingdom
Tel: 0870 60 800 60
www.3M.co.uk/safety

3M Ireland Limited
The Iveagh Building
The Park
Carrickmines
Dublin 18
Tel: 1 800 320 500

Health & Safety Helpline
Available Monday to Friday - 9.00am until 5.00pm

Telephone
0870 60 800 60 (United Kingdom) 1 800 320 500 (Ireland)

George Elliott

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Thank you!

Any questions?