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well **INFORMED**
well **PROTECTED**
well **AHEAD**

Chemical Body Protection	Chemical Hand Protection
EN ISO 27065	ISO 18889

Pesticide Standards

Guide for Updated Personal Protective Equipment (PPE) Standard

Pesticides are chemical substances designed to kill pests and are used in various industries, especially to exterminate disease carrying vectors. Hence, pesticides are often toxic to humans and need to be handled carefully. Ansell goes the extra mile to provide a variety of tools to help you understand all there is to know about the latest regulatory updates and you'll be on your way to better compliance all around. The EN ISO 27065 was updated and the ISO 18889 was recently established to provide an enhanced assessment of PPE against commercial pesticides.

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Learn more: visit ansell.com/enresourcecenter

NEW EN ISO 27065

Adopting the EN ISO 27065 standard

Published in 2017, the EN ISO 27065 has been amended in 2019 with a surrogate chemical mixture to replace Prowl as the standard test chemical. . Before the publication of EN ISO 27065 there were no harmonized clothing standards in this area. In some cases, the German national standard DIN 32781 was used for the approval of some of our suits. Re-entry workers correspond to persons who can be in contact with a partially or fully dried pesticide product, in an area that has previously been treated.

HIGHLIGHTS

EN ISO 27065 Protective clothing - Performance requirements for protective clothing worn by operators applying pesticides and for re-entry workers.

OLD	NEW
DIN 32781	EN ISO 27065

NEW EN ISO 27065

The EN ISO 27065 standard requirements

The standard consists of three levels C1, C2 and C3 with the latter being the highest protection level :

Level		Material	Seam
C1 EN ISO 27065	Level C1 protective clothing, including partial-body: The materials and seams shall demonstrate a minimum level of liquid penetration resistance. The protective clothing, including partial-body, shall pass a practical performance test. A Level C1 item is not suitable for use with concentrated pesticide formulations. It can be used as the base protective clothing with additional items worn when the potential risk is relatively higher.	Penetration < 40%	Penetration < 40%
C2 EN ISO 27065	Level C2 protective clothing, including partial-body: The material and seams shall demonstrate a higher level of liquid penetration resistance than Level C1 protective clothing. The protective clothing, including partial-body, shall pass the practical performance test. The whole-body protective clothing shall pass the low-level spray test. A Level C2 item is not suitable for use with concentrated pesticide formulations. It can be used as the base protective clothing with additional items worn when the potential risk is relatively higher.	Penetration ≤ 5%, ≥ 80% repellency	(Full suit type 6 spray test)
C3 EN ISO 27065	Level C3 protective clothing, including partial-body: The materials and seams shall demonstrate a minimum level of resistance to permeation. The concentration of the test chemical and duration of testing shall be based on the intended use claimed by the manufacturer and included in information provided by the manufacturer. The protective clothing, including partial-body, shall pass the practical performance test. The whole-body protective clothing shall pass a high-level spray test. A Level C3 item is suitable for use with concentrated as well as diluted pesticide formulations.	Permeation, cumulative ≤ 1 µg/cm^2	Permeation, cumulative ≤ 1 µg/cm^2

» Penetration and repellency: ISO 22608 Pipette test using 2.5% “EC-DY” pesticide surrogate

» Permeation: ISO 19918 Solid state collection permeation, using*)

- EC-DY pesticide surrogate diluted to 2.5% for 1 hour and/or
- EC-DY pesticide surrogate (undiluted) for 15 minutes
- Testing with additional pesticides as requested by the manufacturer

NEW EN ISO 27065

Physical requirements for the garment materials are as follows:

Property	Re-usable	Limited use
Tensile strength	180 N	30 N
Tear resistance	10 N	10 N
Puncture resistance - optional	10 N (if claimed)	10 N (if claimed)
Seam strength	180 N	30 N

HIGHLIGHTS

*In the 2019 amendment, the Prowl® commercial pesticide was replaced with the following surrogate chemical mixtures:

Composition of Surrogate Test Chemical EC-DY	CAS #	Function	Nominal Composition (%w/w)	Calculated Nominal Composition (g/L)	Company (If applicable)
Disperse Yellow 26	16611-15-7	Dye (replaces active ingredient)	10	100	
Soprophor BSU	99734-09-5	Emulsifier	2	20	Cytec Solvay Group
Aerosol® OT-A ND	NA - Blend	Emulsifier	18	180	Cytec Solvay Group
Benzyl alcohol	100-51-6	Co-solvent	25	250	
Solvesso 200 ND	64742-94-5	Solvent	45	Up to 1L	Exxon Mobil

NEW ISO 18889

Adopting the ISO 18889 standard

The ISO 18889 standard was recently established for gloves worn by operators when mixing, loading, applying and handling pesticides, as well as re-entry workers. Re-entry workers correspond to persons who can be in contact with a partially or fully dried pesticide product, in an area that has previously been treated. The new standard was published in April 2019. This new standard was created to facilitate the choice of PPE protecting against pesticides.

- The gloves should pass the penetration test (=water/air leak per EN 374-2:2014) – not required for GR gloves
- Glove length should be at least 240 mm for G1 and 290 mm for G2 – not required for GR gloves.
- Compliance to EN ISO 374-1:2016:
  - » at least Type C for level G1 gloves
  - » at least Type B for level G2 gloves
  - » breakthrough time of > 30 minutes against Sodium Hydroxide 40% for GR gloves
- In addition, the cumulative permeation in the gloves is also measured according to ISO 19918:2017. It has been established that EN 16523-1:2015 cannot be used for pesticides due to the specific properties of their inner chemical components which usually cannot be detected through this test method. The tested chemical is a dye surrogate and samples will taken from parts of the glove:
  - » 3 samples will be taken from the palm area (if seams are present, samples will be taken from the seam area)
  - » If the glove is longer than 400 mm, 3 extra samples are needed: taken at the centre and 80 mm from the end of the cuff

NEW ISO 18889

PERFORMANCE RATING

- The compliance results for cumulative permeation are as follow for each category:

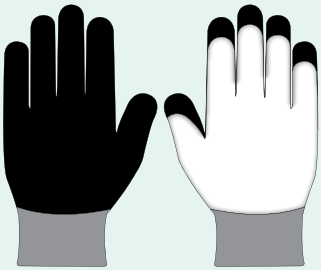
Chemical protective gloves		Mechanical protective gloves
G1	G2	GR
G1 ISO 18889	G2 ISO 18889	GR ISO 18889
Low chemical risk	Higher chemical risk	Re-entry activities only
For contact with **diluted** pesticides	For contact with **diluted and concentrated** pesticides	For dry contact or partially dry pesticide residue
Cumulative permeation of **diluted** solution of Surrogate Test chemical During **1 hour** → max. cumulative permeation = **10 µg/cm²** of disperse yellow	Cumulative permeation of **diluted** solution of Surrogate Test chemical During **1 hour** → max. cumulative permeation = **1 µg/cm²** of disperse yellow	Cumulative permeation of **diluted** solution of Surrogate Test chemical During **1 hour** → max. cumulative permeation = **1 µg/cm²** of disperse yellow
-	Cumulative permeation of **concentrated** solution of Surrogate Test chemical During **15 minutes** → max. cumulative permeation = **1 µg/cm²** of disperse yellow	-

NEW ISO 18889

The ISO 18889 requirements

Performance test	Level G1	Level G2	Re-entry GR
General requirements (EN 420:2003 + A1:2009)	X	X	X
Glove integrity test (EN 374-2:2014)	X	X	
Resistance to cumulative permeation (ISO 19918:2017)	X	X	X
Resistance to permeation (EN ISO 374-1:2016)	X (at least Type C)	X (at least Type B)	X (at least level 2 against NaOH 40%)
Glove design requirements (length)	> 240 mm	> 290 mm	
Mechanical requirements (EN 388:2016)		X	X*
Abrasion		Min level 2	Min level 2
Cut		Min blade cut level 1 or ISO cut level A	Min blade cut level 1 or ISO cut level A
Tear			Min level 1
Puncture		Min level 1	Min level 1

*Minimum coated area for GR gloves:



Palm-side of the hand Back side of the hand

Find out more
Please visit us online for more information:

www.ansell.com/enresourcecenter

WARNING: No glove completely prevents or eliminates the potential for cuts or abrasions. These gloves are not intended or tested to provide protection against powered blades, serrated, or other sharp or rotating equipment, nor will they completely prevent or eliminate the potential for abrasion-related injuries. Users are encouraged to always use caution and care when handling sharp materials. Product users should conduct all appropriate testing or other evaluations to determine the suitability of Ansell products for a particular purpose or use within a particular environment. ANSELL DISCLAIMS ALL WARRANTIES OTHER THAN AS EXPRESSLY PROVIDED.