



**Cooperation Centre for Scientific Research
Relative to Tobacco**

CORESTA GUIDE N° 1

**The Concept and Implementation of
Crop Protection Agents (CPA)
Guidance Residue Levels (GRL)**

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Agro-Chemical Advisory Committee



CORESTA TECHNICAL GUIDE N° 1

Title:

The Concept and Implementation of CPA Guidance Residue Levels

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Date of review	Information
July 2003	Version 1
December 2003	GRL for Pyrethrins (Σ) and Terbufos corrected. CPA terminology corrected.
June 2008	Version 2 – GRLs revised and residue definitions added.
June 2010	Provisional GRL of 2.00 ppm for Cyfluthrin to replace previous GRL of 0.50 ppm.
July 2013	Version 3 – GRLs revised.
October 2013	Note for Maleic Hydrazide revised.
July 2016	Version 4 – GRLs revised + clarification that scope of GRLs applies predominantly to the production of traditional cigarette tobaccos and GAP associated with their cultivation.
June 2018	Fluopyram GRL of 5 ppm added to GRL list.
November 2019	Version 5 – Nine new CPAs with GRLs added to list. Revision of GRLs for Chlorantraniliprole and Indoxacarb. Updated web links.
October 2020	Version 6 – Flupyradifurone GRL of 21 ppm added to GRL list.
October 2021	Version 7 – Paragraph on HHPs added to text
January 2025	Version 8 – Five new provisional GRLs added to list and a provisional GRL of 2 ppm set for Diflubenzuron. References updated.

THE CONCEPT AND IMPLEMENTATION OF CPA GUIDANCE RESIDUE LEVELS

Executive Summary

- Guidance Residue Levels (GRLs) are in the remit of the Agro-Chemical Advisory Committee (ACAC) of CORESTA. Their development is a joint activity of all ACAC members, who represent the leaf production, processing and manufacturing sectors of the Tobacco Industry. The concept of GRLs and their implementation are described in this guide.
- GRLs provide guidance to tobacco growers and assist with interpretation and evaluation of results from analyses of residues of Crop Protection Agents (CPAs*). They therefore serve as an indicator that Good Agricultural Practice (GAP) with respect to CPA use is being implemented. The principles of GAP and CPAs for tobacco are given in “Section V. Agrochemical Management” of CORESTA Guide No. 3 – “Good Agricultural Practices (GAP) Guidelines”
[<https://www.coresta.org/good-agricultural-practices-gap-guidelines-29207.html>].
- The GRLs are applicable to cured tobacco leaf while focusing on processed tobacco leaf which is predominantly used for the production of traditional cigarette tobaccos and the GAPs associated with the cultivation of these tobacco types.
- Compliance with the statutory conditions of use of each CPA as shown in its product “label” is central to using GRLs as a means for monitoring GAP. The relevant information in this context is:
 - Trade and common names of the product;
 - Active ingredient(s);
 - Type of CPA (herbicide, insecticide, suckercide, etc.);
 - Local registration for use on tobacco;
 - Target pests;
 - Timing of application (growth stage) and maximum number of applications;
 - Rate(s) of application;
 - Pre-harvest interval;
 - Mixing and method(s) of application.
- The GRL list is comprised of compounds banned for use in agriculture by International Conventions, those not registered for tobacco but that may occasionally be present in the crop and those registered for tobacco and in common use. It is important to note that:
 - **It is not a list of recommended CPAs for tobacco. That is the case for official and/or industry bodies in each country;**
 - **GRLs have not yet been set for all CPAs registered for tobacco. Setting GRLs is an ongoing process based on a list of priorities decided by frequency of use and importance to leaf production;**
 - **The presence of a compound does not imply endorsement by CORESTA;**
 - **The entries in the list do not replace Maximum Residue Levels (MRLs) set by the authorities. Compliance with MRLs is a legal requirement for countries that have set them for tobacco.**
- The list is reviewed periodically in the light of new information on regulations, analytical capabilities and registration status.
- The following sources of information are referred to when setting GRLs:
 - Results from supervised field trials, where available;
 - Legislation on MRLs for tobacco and other crops;
 - ACAC CPA residue database (CARD);
 - Limits of Quantification (provided by CORESTA Agrochemicals Analysis Sub-Group); and
 - Information provided by CPA manufacturers and tobacco agronomists.
- Reference material and criteria adopted for the setting of each GRL are documented and stored by CORESTA.

* CPAs are agrochemicals used to protect crops from pests and diseases, control unwanted plants (weeds) and regulate growth.

Abstract

Guidance Residue Levels (GRLs) have been developed by the CORESTA Agro-Chemical Advisory Committee (ACAC), to provide guidance to tobacco growers and those in the tobacco industry interested in Crop Protection Agents (CPAs) application and the implementation of Good Agricultural Practice (GAP) in tobacco production.

GRLs are intended to assist with the interpretation and evaluation of CPA residue testing results and serve as an indicator that GAP is being implemented. In 2003 GRLs were developed for 99 CPAs, which may be included in the range of CPA residue analysis routinely offered by the major testing laboratories. The list is revised periodically as needs demand and now covers 116 CPAs. As a result, it contains additional compounds and changes to some of those in the original list following full reviews of all compounds in the light of continuing changes in CPA registrations, labels, regulations and agricultural practices, and based also on improvements in analytical methods, knowledge of degradation patterns and information about residues.

GRLs do not replace requirements to comply with regulations, neither on the use of CPAs, nor with regard to residue levels that may be detected. GRLs are designed to emphasise the importance of GAP for growing quality tobacco.

Introduction

Tobacco cultivation, like the production of nearly all other crops, requires appropriate measures to protect the growing plant in order to secure desired quality and acceptable yield, as well as to preserve the crop after harvesting. Responsible and considerate use of CPAs may, in some cases, lead to unavoidable residues remaining on the crop. Consequently, just as is the case with other crops, CPA residues may be detectable on commercial tobacco and in finished tobacco products.

International and national authorities regulate the residues of CPAs in food and feed crops, but there is no universal consensus with regards to tobacco. CORESTA members have identified the need to provide information to the tobacco growers and tobacco industry based on the best available technical and scientific knowledge and historical residue data on tobacco. This guidance should be based on the levels of residues that may be present after applications of CPAs using GAP.

In some countries both growers and companies have legal obligations to address the use of CPAs in tobacco cultivation and the presence of residues on tobacco. They should also act in a socially responsible manner ensuring that CPAs are used responsibly in accordance with GAP. Legal obligations can include compliance with all applicable statutory Maximum Residue Levels (MRLs).

GAP in the Use of Pesticides, as defined by Codex Alimentarius^[1], includes the nationally authorised safe uses of pesticides under actual conditions necessary for effective and reliable pest control. It encompasses a range of levels of pesticide applications up to the highest authorised use, applied in a manner which leaves a residue which is the smallest amount practicable.

Authorised safe uses are determined at the national level and include nationally registered or recommended uses, which take into consideration public and occupational health and environmental safety. Actual conditions include any stage in the production, storage, transport, distribution and processing of food commodities and animal feed.

The authorised safe use forms a section of the “Product Label” and in many countries handlers and users who do not comply in detail with these instructions may be prosecuted. The usual information on the Label includes the crops to which the product can be applied, the timings and maximum number of applications per season, the application rate, the interval between the last application and harvest and considerable information on safety aspects. Compliance with the Product Label is, therefore, one of the key elements of GAP. CORESTA and its ACAC strongly support the use of GAP in tobacco production and have used this as the main principle for this proposal on guidance residue levels.

The international oversight guidance for CPAs residues in food is through Codex Alimentarius. Codex MRLs, which are primarily intended to apply in international trade, are used to assist national governments in setting their MRLs and are based on GAP.

Development of Guidance Residue Levels

In order to provide guidance to tobacco growers and the tobacco industry with regard to CPA residues on cured tobacco leaf, ACAC has developed over the past years the concept of

Guidance Residue Levels. GRLs embrace the same concepts used by Codex, but to avoid any confusion over terminology the term “Guidance Residue Levels” is proposed thereby distinguishing these levels from regulatory MRLs. The purpose of GRLs is to provide a benchmark for comparing results obtained from CPA residue testing of leaf samples. They attempt to answer the questions:

- What residue should one expect when the label recommendations are being followed and GAP is being implemented?

- How can one distinguish between residues that result from authorised use, unauthorised use or another environmental source of a CPA?

CPAs were categorised into four groups:

1. CPAs that are authorised for use on tobacco;
2. Obsolete or unauthorised CPAs that may still be available to farmers in some countries;
3. Obsolete CPAs that may persist in the growing environment;
4. Certain CPAs with well-established statutory MRLs.

<i>Category of CPA</i>	<i>Basis for Guidance Residue Level</i>
Important CPAs authorised for use on tobacco	Applicable legislated levels, or the highest acceptable residue that might be expected from GAP
CPAs that should not be used on tobacco or are not known to be authorised for use on tobacco	The Limits of Quantification with the current analytical methods
CPAs that are no longer used but remain in the environment	Internationally accepted residue levels or legal / regulatory MRLs
CPAs that are covered by specific tobacco laws and regulations but not covered in any of the above categories	The legal / regulatory MRLs

As is the case with setting MRLs, which are set “by an experienced expert after he has consulted all the available documentation and information on the residue situation of the envisaged application of the product”^[2], the GRLs were developed from many different sources of information. A commercial database^[3] and information about registration in several countries (Homologa database^[12]) were used for determining the most important CPAs that are being sold for use on tobacco. Cognisance was made of those CPAs that are being severely restricted through the different international conventions^[4,5] and the CPA residues commonly tested for in national residue monitoring programmes^[6,7,8]. Those CPA residues that arise as contaminants from environmental sources (including former agricultural uses) and are given in Codex as Extraneous Maximum Residue Limit^[9] (EMRL) were also used as an information source.

The current list does not necessarily include every CPA authorised for use on tobacco in some places in the world. Exclusion of particular CPAs from the list of GRLs would not mean that their use was unacceptable, as long as their use complied with all relevant laws

and regulations. At the same time, inclusion of particular CPAs in the list of GRLs does not mean that their use is specifically endorsed.

The GRLs have also been broadly compared with acceptable intake levels established for food evaluation by the U.S. EPA^[10] and JMPR^[11] where they were available.

Limited residue data are available from specific field experiments conducted by manufacturers and research institutes. In addition, for many years CPA residues have been examined on tobacco leaf to confirm compliance with relevant standards. Over time, these measurements have given a good indication of CPA residue levels that can be expected even when GAP is followed. ACAC has reviewed these data and examined relevant laws and regulations to develop a list of GRLs for a number of commonly tested CPAs.

In determining the GRLs for individual residues, account was also taken of the chemical and physical properties of the compound and the precision at which the residue can be measured.

Some CPAs that are known to be widely authorised for use on tobacco tend to have higher GRLs but for some non-persistent, or non-systemic

soil applied active ingredients, such as some of the organophosphates, the GRLs are lower. Some of the differences between the GRLs for the unauthorised active ingredients are the capability of the major tobacco residue testing laboratories to detect the residue. In order to ensure that the GRLs can be reliably detected by most laboratories, the Limits of Detection (LOD) and Limits of Quantification (LOQ) of several laboratories were examined and a consensus value arrived at for these residues.

GRLs are now defined, using the information detailed above, for 116 individuals, or groups of, CPA active ingredients (Table 1). In two exceptional cases, dithiocarbamates (EBDCs) and maleic hydrazide (MH), it was recognised that the proper use of the CPA is determined by a number of complex factors that may be quite variable from area to area. Rather than suggesting multiple GRLs for different situations, ACAC decided to specify only one GRL for each CPA and amend it by clearly worded admonitory commentaries offering advice and warning.

Use of Guidance Residue Levels

The main purpose of providing this guidance is to assist the sectors of the tobacco industry, most closely associated with tobacco leaf producers, in the evaluation of results from CPA residue testing. Companies determine for themselves the analysis to be conducted in order to identify specific CPA residues. This may depend on where tobaccos are grown or purchased, the necessity to comply with statutory MRLs, or their own product (leaf or finished product) stewardship programmes. The introduction of the GRL concept should allow the same information to also be used for monitoring compliance to GAP.

The list of GRL values is neither a regulatory requirement nor mandatory - but is designed to emphasise the importance of GAP for growing good quality tobacco. In some cases, results for individual CPAs will be obtained that exceed the GRL. This, along with other evidence, could be taken as a preliminary indication that GAP might not have been observed and that remedial action may be required to ensure that, in the future, farmers have followed proper procedures. In a small number of exceptional cases, perhaps arising from local environmental and practical considerations, there may be valid reasons, even under strict compliance with GAP, why residues of a few active ingredients exceed a specified GRL. An illustration of this

is the residues of the two CPAs mentioned above – the dithiocarbamates and maleic hydrazide (MH).

In countries with severe blue mould epidemics and where only dithiocarbamates are available for combating this disease, residues above the stated 5 ppm might arise. Where effective systemic fungicides, such as metalaxyl and dimethomorph, are authorised and insensitive strains do not occur, the problem is much smaller and the specified level more easily achievable. In countries where blue mould does not occur regularly in the field it should not be necessary to apply these fungicides. For late season leaf diseases alternative fungicides should, if possible, be found or the dithiocarbamates used with care with strict adherence to the label on the harvest interval.

With maleic hydrazide, the residues are highly dependent on the amount of rainfall following application. Small amounts of rain can substantially reduce the level of residues but in dry years even when it has been applied according to the current label conditions there could be difficulties achieving the 80 ppm limit. There is considerable research into finding agronomic practices to reduce residue levels. For example, examining different rates of application in conjunction with fatty alcohols, sprayer and spray nozzle designs, changes to fertiliser applications and new sucker control chemicals.

Following this approach, potential elevated residues can be addressed. In this context, the GRL concept should be viewed as a way of establishing targets for improvement aimed at a further reduction of CPA residue levels and as roadmaps to improve GAP. It is intended that GRLs should become an integral part in the pragmatic management of CPA residues on tobacco along with appropriate approaches for sampling, residue testing, the assessment of analytical results and an action plan from the results.

If the information from the residue analysis can be fed back to the extension services and farmers in the areas where issues have been highlighted, real progress can be made to address any problems.

Based on history, the main reasons for a residue exceeding a GRL of a CPA authorised for use are often: applications of a CPA too close to harvesting; too many applications in one crop year and exceeding the recommended application rate. Information pertaining to application rate, timing and harvest interval should be on the

Product Label, and if the CPA has been appropriately scrutinised during the authorisation procedures, few issues with residues exceeding the GRLs should arise.

Guidance Residue Levels and Highly Hazardous Pesticides (HHPs)

WHO-FAO describes HHPs as the “Pesticides that are acknowledged to present particularly high levels of acute or chronic hazards to health or environment...”. The WHO-FAO encourages the identification of HHPs in use, an assessment of their associated risks, and decisions made on appropriate measures to mitigate these risks.

The CPA list in this Guide is neither all-encompassing nor exhaustive of all CPAs used in tobacco leaf production. Rather, it is comprised of the predominant compounds that are registered for use in tobacco, those that are banned by International Conventions and those that are not registered for use in tobacco but are occasionally detected. Therefore, the list also contains some CPAs classed as HHPs.

CORESTA Guide No. 27^[13] on the Identification and Elimination of Highly Hazardous Pesticides (HHPs) in Leaf Tobacco Production, facilitates the access to key basic information on HHPs, such as: identification; risk assessment and risk mitigation; and elimination.

Guide No. 27, produced by ACAC, promotes specific awareness on HHPs use in tobacco leaf production and provides an indicative reference list of HHPs, irrespective of their GRL status. Guide No. 27 adds to existing CORESTA Guides that address responsible agrochemical management.

Future Developments

The GRL concept continues to be a major part of ACAC’s work in the future. The list of GRLs will be periodically reviewed to reflect changes in CPA registrations and labels, laws and regulations, agricultural practices, information and data from residue trials and/or other scientific knowledge. There are also discussions on how this objective assessment of residue information can facilitate sharing of information so that areas of general concern can be more openly identified. Once issues have been identified, CORESTA and ACAC may be able to give appropriate guidance and assistance to the leaf production sector on residue issues. In connection with this proposal on GRLs, ACAC is working with the CORESTA Agrochemical Analysis Sub-Group on a proficiency testing programme, whereby individual laboratories involved in tobacco residue testing can benchmark their methods with other companies undertaking the same test. This is facilitating harmonisation on limits of quantification and gives CORESTA members increased confidence that their samples are being tested with appropriate methods.

The development of the concept and details of GRLs is a joint activity of all ACAC members, comprised of representatives of the leaf growing, processing and manufacturing sectors of the Tobacco Industry. Although implementation is an individual matter for companies, the members of ACAC envisage industry-wide acceptance of GRLs as a useful measure for ensuring adherence to GAP in the production of predominantly traditional cigarette tobaccos.

References

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10. US Environmental Protection Agency, Pesticide Reregistration Status.
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11. WHO - Inventory of evaluations performed by the Joint Meeting on Pesticide Residues (JMPR)
<https://apps.who.int/pesticide-residues-jmpr-database/>
12. Homologa™, The Global Crop Protection Database. <https://v5.homologa.com/en/>
13. CORESTA Guide No. 27 - Identification and Elimination of Highly Hazardous Pesticides (HHPs) in Leaf Tobacco Production
<https://www.coresta.org/identification-and-elimination-highly-hazardous-pesticides-hhps-leaf-tobacco-production-33021.html>

Table 1. CPA Guidance Residue Levels (GRLs)

- This is not a list of recommended Crop Protection Agents (CPAs) for tobacco. That is the case for official and/or industry bodies in each country.
- GRLs have not yet been set for all CPAs registered for tobacco. Setting GRLs is an ongoing process based on a list of priorities decided by frequency of use and importance to leaf production.
- The presence of a compound does not imply endorsement by CORESTA.
- The entries in the list do not replace Maximum Residue Levels (MRLs) set by the authorities. Compliance with MRLs is a legal requirement for countries that have set them for tobacco.

No.	CPA	GRL (ppm)	Residue definition	Notes
1	2,4,5-T	0.05	2,4,5-T	
2	2,4-D	0.2	2,4-D	
3	Acephate	0.1	Acephate	
4	Acetamiprid	3	Acetamiprid	
5	Acibenzolar-S-methyl	5	Acibenzolar-S-methyl	
6	Alachlor	0.1	Alachlor	
7	Aldicarb (Σ)	0.5	sum of Aldicarb, Aldicarb sulfoxide and Aldicarb sulfone, expressed as Aldicarb	
8	Aldrin + Dieldrin	0.02	Aldrin + Dieldrin	
9	Azinphos-ethyl	0.1	Azinphos-ethyl	
10	Azinphos-methyl	0.3	Azinphos-methyl	
11	Azoxystrobin	16	Azoxystrobin	
12	Benalaxyl	2	Benalaxyl	
13	Benfluralin	0.06	Benfluralin	
14	Benomyl ^(a)		sum of Benomyl, Carbendazim, and Thiophanate-methyl expressed as Carbendazim	see Carbendazim
15	Bifenthrin	3	Bifenthrin	
16	Bixlozone ^(h)	0.03	Bixlozone	A provisional GRL for Bixlozone has been set at 0.03 ppm. This GRL will be reviewed again in the future based on the outcome of further residue trials and analytical results from forthcoming tobacco crops. (Nov 2024)
17	Bromophos	0.04	Bromophos	
18	Butralin	5	Butralin	
19	Camphechlor (Σ) (Toxaphene)	0.3	Camphechlor (mixture of chlorinated camphenes)	
20	Captan	0.7	Captan	
21	Carbaryl	0.5	Carbaryl	
22	Carbendazim ^(a)	2	sum of Benomyl, Carbendazim, and Thiophanate-methyl expressed as Carbendazim	
23	Carbofuran (Σ)	0.5	sum of Carbofuran and 3-Hydroxycarbofuran expressed as Carbofuran	
24	Chinomethionat	0.1	Chinomethionat	
25	Chlorantraniliprole	14	Chlorantraniliprole	
26	Chlordane (Σ)	0.1	sum of cis-Chlordane and trans-Chlordane	

No.	CPA	GRL (ppm)	Residue definition	Notes
27	Chlorfenvinphos (Σ)	0.04	sum of (E)-Chlorfenvinphos and (Z)-Chlorfenvinphos	
28	Chlorothalonil	1	Chlorothalonil	
29	Chlorpyrifos	0.5	Chlorpyrifos	
30	Chlorpyrifos-methyl	0.2	Chlorpyrifos-methyl	
31	Chlorthal-dimethyl	0.5	Chlorthal-dimethyl	
32	Clomazone	0.2	Clomazone	
33	Cyantraniliprole	18	Cyantraniliprole	
34	Cyclobutrifluram ^(h)	2	Cyclobutrifluram	A provisional GRL for Cyclobutrifluram has been set at 2 ppm. This GRL will be reviewed again in the future based on the outcome of further residue trials and analytical results from forthcoming tobacco crops. (Nov 2024)
35	Cyfluthrin (Σ)	2	Cyfluthrin (sum of all isomers)	
36	Cyhalothrin (Σ)	0.5	Cyhalothrin (sum of all isomers)	
37	Cymoxanil	0.1	Cymoxanil	
38	Cypermethrin (Σ)	1	Cypermethrin (sum of all isomers)	
39	DDT (Σ)	0.2	sum of o,p'- and p,p'-DDT, o,p'- and p,p'-DDD (TDE), o,p'- and p,p'-DDE expressed as DDT	
40	Deltamethrin ^(b)	1	sum of Deltamethrin and Tralomethrin expressed as Deltamethrin	
41	Demeton-S-methyl (Σ)	0.1	sum of Demeton-S-methyl, Oxydemeton-methyl (Demeton-S-methyl sulfoxide) and Demeton-S-methyl sulfone expressed as Demeton-S-methyl	
42	Diazinon	0.1	Diazinon	
43	Dicamba	0.2	Dicamba	
44	Dichlorvos ^(c)	0.1	sum of Dichlorvos, Naled and Trichlorfon expressed as Dichlorvos	
45	Dicloran	0.1	Dicloran	
46	Difenoconazole	12	Difenoconazole	
47	Diflubenzuron ^(g)	2	Diflubenzuron	In line with the policy of periodic reviews of GRLs by ACAC, a provisional GRL for Diflubenzuron has been set at 2 ppm. This is the result of new, scientifically based information from residue trials and reflects current knowledge. This provisional GRL will continue to be evaluated as additional data becomes available. (Nov 2024)
48	Dimethoate ^(d)	0.5	sum of Dimethoate and Omethoate expressed as Dimethoate	
49	Dimethomorph (Σ)	2	sum of (E)-Dimethomorph and (Z)-Dimethomorph	
50	Disulfoton (Σ)	0.1	sum of Disulfoton, Disulfoton sulfoxide, and Disulfoton sulfone expressed as Disulfoton	

No.	CPA	GRL (ppm)	Residue definition	Notes
51	Dithiocarbamates (as CS ₂) ^(e)	5	Dithiocarbamates expressed as CS ₂	In countries where fungal diseases such as blue mould are a persistent problem in the field throughout the growing season, the use of dithiocarbamates (DTC) fungicides may be an essential part of the season-long disease management strategy and in keeping with GAP as a means of ensuring crop quality and economic viability for the producer. Under high disease pressure residues of dithiocarbamates (DTC) fungicides slightly in excess of the specified GRL may be observed. In countries where there is not a field fungal disease problem the use of fungicides is not necessary, and there should be no residues detected. Consistent with GAP, dithiocarbamate (DTC) fungicides must be used only according to label instructions to combat fungal diseases in the seedbed and in the field.
52	Endosulfans (Σ)	1	sum of alpha- and beta-isomers and Endosulfan-sulphate expressed as Endosulfan	
53	Endrin	0.05	Endrin	
54	Ethoprophos	0.1	Ethoprophos	
55	Famoxadone	5	Famoxadone	
56	Fenamidone	3	Fenamidone	
57	Fenamiphos (Σ)	0.5	sum of Fenamiphos, Fenamiphos sulfoxide and Fenamiphos sulfone expressed as Fenamiphos	
58	Fenitrothion	0.1	Fenitrothion	
59	Fenthion (Σ)	0.1	sum of Fenthion, Fenthion sulfoxide and Fenthion sulfone expressed as Fenthion	
60	Fenvalerate (Σ)	1	Fenvalerate (sum of all isomers including Esfenvalerate)	
61	Fluazifop-butyl (Σ)	1	Fluazifop-butyl (sum of all isomers)	
62	Flubendiamide	18	Flubendiamide	
63	Flumetralin	5	Flumetralin	
64	Fluopyram	5	Fluopyram	
65	Flupyradifurone	21	Flupyradifurone	
66	Folpet	0.2	Folpet	
67	HCH (α-, β-, δ-)	0.05	HCH (α-, β-, δ-)	
68	HCH (γ-) (Lindane)	0.05	HCH (γ-) (Lindane)	
69	Heptachlor (Σ)	0.02	sum of Heptachlor and two Heptachlor epoxides (cis- and trans-) expressed as Heptachlor	
70	Hexachlorobenzene	0.02	Hexachlorobenzene	
71	Imidacloprid	5	Imidacloprid	
72	Indoxacarb (Σ)	6	Sum of S isomer + R isomer	
73	Iprodione (Σ)	0.5	sum of Iprodione and N-3,5-dichlorophenyl-3-isopropyl-2,4-dioxoimidazolizin-1-carboxamide expressed as Iprodione	

No.	CPA	GRL (ppm)	Residue definition	Notes
74	Isocycloseram ^(h)	10	Isocycloseram	A provisional GRL for Isocycloseram has been set at 10 ppm. This GRL will be reviewed in the future based on the outcome of further residue trials and analytical results from forthcoming tobacco crops. (Nov 2024)
75	Malathion	0.5	Malathion	
76	Maleic hydrazide	80	Maleic hydrazide (free and bounded form)	In some instances, where GAP is implemented and label recommendations with regard to application rates and timing are strictly adhered to, residue levels may exceed the current GRL of 80 ppm as a result of extreme weather conditions and the current technology available for application. However, as with all CPAs, all efforts should be made to strictly follow label application rates, and use should be no more than necessary to achieve the desired effect.
77	Metalaxyl (Σ)	2	sum of all isomers including Metalaxyl-M / Mefenoxam	
78	Methamidophos	1	Methamidophos	
79	Methidathion	0.1	Methidathion	
80	Methiocarb (Σ)	0.2	sum of Methiocarb, Methiocarb sulfoxide, and Methiocarb sulfone expressed as Methiocarb	
81	Methomyl ^(f)	1	sum of Methomyl, Methomyl-oxim, and Thiodicarb expressed as Methomyl	
82	Methoxychlor	0.05	Methoxychlor	
83	Mevinphos (Σ)	0.04	Mevinphos (sum E and Z isomers)	
84	Mirex	0.08	Mirex	
85	Monocrotophos	0.3	Monocrotophos	
86	Naled ^(c)		sum of Dichlorvos, Naled, and Trichlorfon expressed as Dichlorvos	see Dichlorvos
87	Nitrofen	0.02	Nitrofen	
88	Omethoate ^(d)		sum of Dimethoate and Omethoate expressed as Dimethoate	see Dimethoate
89	Oxadixyl	0.1	Oxadixyl	
90	Oxamyl	0.5	Oxamyl	
91	Parathion (-ethyl)	0.06	Parathion	
92	Parathion-methyl	0.1	Parathion-methyl	
93	Pebulate	0.5	Pebulate	
94	Penconazole	1	Penconazole	
95	Pendimethalin	5	Pendimethalin	
96	Permethrin (Σ)	0.5	Permethrin (sum of all isomers)	
97	Phorate	0.05	Phorate	
98	Phosalone	0.1	Phosalone	
99	Phosphamidon (Σ)	0.05	Phosphamidon (sum of E and Z isomers)	
100	Phoxim	0.5	Phoxim	
101	Piperonyl butoxide	3	Piperonyl butoxide	

No.	CPA	GRL (ppm)	Residue definition	Notes
102	Pirimicarb	0.5	Pirimicarb	
103	Pirimiphos-methyl	0.1	Pirimiphos-methyl	
104	Profenofos	0.1	Profenofos	
105	Propamocarb	13	Propamocarb	
106	Propoxur	0.1	Propoxur	
107	Pymetrozine	1	Pymetrozine	
108	Pyrethrins (Σ)	0.5	sum of Pyrethrins 1, Pyrethrins 2, Cinerins 1, Cinerins 2, Jasmolins 1 and Jasmolins 2	
109	Spiropidion (Σ) ^(h)	0.2	sum of Spiropidion and Spiripidion-enol	A provisional GRL for Spiropidion has been set at 0.2 ppm. This GRL will be reviewed again in the future based on the outcome of further residue trials and analytical results from forthcoming tobacco crops. (Nov 2024)
110	Sulfentrazone ^(h)	0.15	Sulfentrazone	A provisional GRL for Sulfentrazone has been set at 0.15 ppm. This GRL will be reviewed again in the future based on the outcome of further residue trials and analytical results from forthcoming tobacco crops. (Nov 2024)
111	Tebuconazole	18	Tebuconazole	
112	Teflubenzuron	3	Teflubenzuron	
113	Tefluthrin	0.1	Tefluthrin	
114	Terbufos (Σ)	0.05	sum of Terbufos, Terbufos sulfoxide and Terbufos sulfone expressed as Terbufos	
115	Thiamethoxam	5	Thiamethoxam	
116	Thiodicarb ^(f)		sum of Methomyl, Methomyl-oxim, and Thiodicarb expressed as Methomyl	see Methomyl
117	Thionazin	0.04	Thionazin	
118	Thiophanate-methyl ^(a)		sum of Benomyl, Carbendazim, and Thiophanate-methyl expressed as Carbendazim	see Carbendazim
119	Tralomethrin ^(b)		sum of Deltamethrin and Tralomethrin expressed as Deltamethrin	see Deltamethrin
120	Trichlorfon ^(c)		sum of Dichlorvos, Naled, and Trichlorfon expressed as Dichlorvos	see Dichlorvos
121	Triflumuron	4	Triflumuron	
122	Trifluralin	0.1	Trifluralin	

- (a) Carbendazim is the degradation product of Benomyl and Thiophanate-methyl. In case the same sample contains residues of both Carbendazim and/or Benomyl/Thiophanate-methyl, the sum of the residues should not exceed 2 ppm.
- (b) Deltamethrin is the degradation product of Tralomethrin. In case the same sample contains residues of both Deltamethrin and Tralomethrin, the sum of the two residues should not exceed 1 ppm.
- (c) Dichlorvos is the degradation product of Naled and Trichlorfon. In case the same sample contains residues of both Dichlorvos and/or Naled/Trichlorfon, the sum of the residues should not exceed 0.1 ppm.
- (d) Omethoate is the degradation product of Dimethoate. In case the same sample contains residues of both Dimethoate and Omethoate, the sum of the two residues should not exceed 0.5 ppm.
- (e) The Dithiocarbamates Group includes the EBDCs: Mancozeb, Maneb, Metiram, Nabam and Zineb – as well as Amobam, Ferbam, Polycarbamate, Propineb, Thiram and Ziram.
- (f) Methomyl is the degradation product of Thiodicarb. In case the same sample contains residues of both Methomyl and Thiodicarb, the sum of the two residues should not exceed 1 ppm.
- (g) The 2 ppm level for Diflubenzuron is a provisional GRL. It replaces the previous GRL of 0.1 ppm. (November 2024)
- (h) Provisional GRLs set for Bixlozone, Cyclobutrifluram, Isocycloseram, Spiropidion and Sulfentrazone (November 2024)

NOTE 1:

July 2016: The following CPAs were removed from the GRL list as sources consulted show no detections over the last 10 years, they are not registered for tobacco in any country and they are no longer used: DBCP, Dimefox, Dinocap (Σ), Diphenamid, Ethylene dibromide, Fenchlorphos, Fensulfothion, Flucythrinate (Σ), Fonofos (Σ), Formothion, Isopropaline, Methoprene, Tetrachlorvinphos, Vamidothion (Σ)

NOTE 2:

July 2016: GRL values were rounded according to international guidelines, including: OECD: ENV/JM/MONO (2011)2. OECD MRL CALCULATOR: USER GUIDE; Series on Pesticides No. 56