# GRDC PODCAST TRANSCRIPT

**Grain Storage Masks and Meters**

[00:00:05] **Introduction** This is a GRDC podcast.

[00:00:12] **Debra Bishop** Phosphine fumigation is commonly used in gas-tight sealed silos to control weevils in grain, but it's potentially a fatal gas, and So, it's vital to avoid exposure by wearing full personal protective equipment or PPE, when you're working with phosphine. Hello, I'm Debra Bishop. Yes, there's no doubt that phosphine is dangerous, but it can be used safely with responsible handling and management. In fact, the continuing availability on-farm of this important grain insect treatment depends on its safe use, with misuse resulting not only in poor insect control and developing resistance in key pest species, but potential serious injury or even death of those working with it. Full-face respirator masks, appropriate filter selections for those masks, and phosphine meters are all integral components of your phosphine safety kit. We talked to Grain Storage Extension Project lead, Chris Warrick, along with Alex Conway, about the significant safety around phosphine, which remains the single most relied-upon fumigant to control stored grain pests in Australia's grain production systems.

[00:01:28] **Chris Warrick** As part of the Grain Storage Extension team, we're asked a lot of questions about phosphine for use on-farm because it's the only fumigant that we have to control insects without going to engage a commercial fumigator. So, doing it safely is really paramount and Alex, you've been looking at masks suitable for phosphine use?

[00:01:45] **Alex Conway** Yeah, absolutely. So, we do find that we do need the correct PPE when we are handling phosphine on-farm and, because it is a potentially dangerous gas, we need to ensure we're handling it safely. So, the mask is definitely one big component of that. We need to ensure that we do have a full-face mask and we are using the correct filters. So, I know we typically have a lot of masks on-farm; it's not the same mask we're using by blown down the header or handling other chemicals. We really need to ensure that those filters we're using on the masks are specific for handling phosphine.

[00:02:16] **Debra Bishop** And there's an actual suction test to conduct as well isn't there? To determine you're fitting that mask correctly.

[00:02:21] **Alex Conway** Yeah, correct. So, obviously there's no point to having a mask that isn't going to fit our face properly, So, we do do a little test to ensure that it is fitted correctly. So, to do so, we actually place our hand over the filter ports once we've got the mask on, take a deep breath in like we do on a scuba mask, and we actually want to feel that mask suction onto our face. And that does ensure that we've got a good seal and we're not sucking air in from somewhere else.

[00:02:45] **Debra Bishop** But then again, there's the consideration of the mask filter, isn't there? The selection of that is equally as important to make sure you've got the right mask as well as the right filter?

[00:02:53] **Alex Conway** Absolutely. It is incredibly important, and the best way to go about that is talk to your distributor when you are buying the mask and ensure that they are confident that that mask is going to filter phosphine particles.

[00:03:05] **Chris Warrick** The other important component of PPE that we need to consider is those gloves, so, protecting your hands from contacting phosphine and the label requests elbow length PVC gloves. And of course, they need to be washed and stored appropriately as per the label directions when you're finished using them. And I think it's probably worth reminding people that this PPE needs to be used when they're applying phosphine, as well as when they're removing the residue from the fumigation at the end. So, that residue, while it should be all spent, can still have some phosphine hanging around and of course, if you're opening a storage that's just been under fumigation, high chance there's going to be some phosphine come out there, some gas, so, ensuring you're wearing the full PPE application and venting.

[00:03:45] **Debra Bishop** And just one more aspect of that, the cleaning, the washing and storing of PPE that you've used in regard to phosphine usage, particular recommendations on that?

[00:03:56] **Chris Warrick** The label, in most cases, calls for soapy water, but common sense usually prevails there if people know how to look after equipment. And storing your sealed containers is probably worthwhile doing and really looking after it. As we said earlier, it's probably going to save your life or potentially going to save your life. So, look, after it.

[00:04:11] **Debra Bishop** Now the storage of this sort of equipment; the handling of it, the cleaning of it, there would be procedures for that as well, I'd imagine, when you're working with a gas like this.

[00:04:19] **Chris Warrick** Yeah, like with any equipment, you want to look after it. This particular piece of equipment in a gas mask could save your life, So, worth taking extra care and make sure it's cleaned before you put it away. Store filters in a separate sealed container and follow the label directions for replacement of those filters. In some cases, they're only a single use filter, in other cases, they'll depend on how long they've been exposed to gas and at what concentrations. So, always follow the label recommendations on storage and disposal of, or replacement of those filters.

[00:04:47] **Debra Bishop** Now that's the PPE that you wear, but then you also, have technology, I suppose, that can also assist in protecting you against the effects of this gas. Alex, take us through some of that.

[00:04:56] **Alex Conway** So, there's some phosphine monitoring equipment available, So, it is really important to understand what we want to use this monitoring equipment for. So, whether it's for safety and our workers, and when we're handling phosphine, or whether it's to give us the ability to monitor our concentrations of phosphine throughout a fumigation. So, it is important to know that they are actually two very different devices. So, we do have low-range phosphine meters and they typically detect levels of about 0-20 ppm; we clip them to the collar of our shirt when we're handling phosphine, and they actually send out an alert when it gets to a dangerous level. So, they are exceptionally important devices, and we are seeing them used more and more and I think it really is a good thing to have on-farm.

[00:05:36] **Chris Warrick** It's probably worth just noting there, Alex, that the level of accuracy for these meters is so precise. They're monitoring gas levels down to .3 parts per million, so, we're really asking them to do a fair bit. So, again, we need to look after these meters and understand what we're asking them to do and to realise that they're going to give us a warning before our nose will. They'll go off well before you can smell phosphine, so, really worthwhile.

[00:05:59] **Debra Bishop** We've also, got the high-range meters though. They detect 0-2000ppm, why wouldn't we just go for that to start with? Are you placing yourself at potential risk by getting a low-range meter to begin with? I mean, what do you know that you're measuring here, before you've measured it I suppose?

[00:06:15] **Alex Conway** It really does come down to resolution. So, as you say, we can monitor very high levels with these high-range monitors, but they're used for when we’re fumigating inside the silos. That's when we are seeing very high levels of phosphine. But naturally, as a result of that high range, we don't get a very good resolution, so, we're only measuring about 1ppm and as Chris mentioned, at that point, it is potentially dangerous. So, that is why we need a device with greater resolution measuring down to that .3ppm, to ensure that we're not putting ourselves in harm’s way.

[00:06:46] **Debra Bishop** Is this an area of farm technology that is continually improving? I mean, is technology changing and are we finding different, better, improved ways of increasing that protection for growers in this environment?

[00:06:57] **Chris Warrick** Yeah, the availability of these meters I think is, to a point now, where it's affordable for on-farm use and that also, matches the scale of some on-farm storages. They're quite significant and in some cases, a whole other enterprise on-farm. So, to spend a few thousand dollars on a meter that could save your life or a meter that could save your rejected load at out-turn because you've still got phosphine residue there, can be well worth it. So, the price of these meters has come down and also, the availability of meters that can monitor phosphine during a fumigation. So, there are some newer devices now that you can put in the silo that will give you real-time measurements on your gas level in the silo to ensure that you are getting a successful fumigation and reaching the concentration for the period of time required to kill insects at all life stages.

[00:07:40] **Alex Conway** Another really important note there, I think, Chris, is it gives us a bit of a step in the traceability process as well because we're now logging that data throughout the fumigation process. So, we've got a really good record, that we have met our requirement to fumigate properly, I see at some stage that information will become a very important step in the traceability and the supply chain. I do see that it seems to be a real direction in which the industry is moving and having that information I think will be pretty critical moving forward.

[00:08:08] **Debra Bishop** Yeah, absolutely. It's an area on-farm management, no shortcuts essentially as well, and Chris, you mentioned it's a few thousand dollars to invest in this equipment and technology, but it is equipment that could potentially save your life.

[00:08:20] **Chris Warrick** The personal phosphine meters will start at around $1000, slightly under or over, but they can also, be used, not just for personal safety, but for actually clearance meters. So, making sure, after a fumigation, that all the gas has been vented adequately out of the storage. Some bulk handlers, commercial purchases of grain, will actually test loads on delivery. So, to be able to test the grain before it leaves farm, makes sure you're not getting expensive backloads. And in a lot of cases when growers talk to me about the cost of these meters, they say "Oh, 1500 bucks is a fair bit of money", you say "Well, how much does it cost you to backload from port?", and that's probably about 1500 bucks. So, if I can save one backload, there's one meter paid for, regardless of the safety benefit that we know we need.

[00:09:01] **Debra Bishop** So, Chris, where can growers get more information through the team in regard to this?

[00:09:05] **Chris Warrick** The Stored Grain website, storedgrain.com.au, has some fantastic resources on it; links to manufacturers who can supply this equipment and also, the GRDC GrowNotes on Grain Storage explains the process of fumigating, venting, and the use of these meters. And there's a phone number as well that people can call.

[00:09:22] **Alex Conway** It's 1800 WEEVIL, or, 1800 933 845 and it actually puts you in contact with a Grain Storage Extension team member. So, you can actually talk to a real-world person based within your locality. And they really are there just to answer your questions, point you in the direction of resources and information you can utilise to try and get the best results and if they don't have the answers, they bounce ideas around and they will find that answer for you. So, I really do recommend that growers lean on that resource and really try to utilise that service.

[00:09:52] **Debra Bishop** Okay, great advice there, Alex, Thanks very much. Chris, thank you too for your time today.

[00:09:56] **Chris Warrick** Thanks.

[00:09:56] **Alex Conway** No worries, thank you.

[00:10:04] **Debra Bishop** We've been listening to GRDC's Grain Storage Extension Project members, Chris Warrick and Alex Conway. And as we heard, more information is on GRDC's website, and of course thanks to GRDC's investment in the 1800 WEEVIL hotline, that's 1800 933 845. You can call a national team member for information about masks and meters for phosphine and for all your other grain storage management advice too. I'm Debra Bishop and thanks for listening.