In-farm self-inspection and calibration of sprayers SPISE ADVICE manuals and quick guides

TWG 18: G. Doruchowski TWG 20: P. Balsari M. Roettele E. Nilsson

PISE 8

A. Godyń



<u>SPISE ADVICE manuals – 14 published documents (8 regarding the inspection of PAE)</u>

- developed by SPISE Working Group upon proposals of several Technical Working Groups
- provide technical instructions describing procedures for inspection and calibration of PAE
- tackled by SUD but not yet by the existing ISO/CEN standards
- applicable on voluntary basis



SPISE 8

DIRECTIVE 2009/128/EC

<u>Article 8</u>

 Member States shall ensure that pesticide application equipment in professional use shall be subject to inspections at regular intervals.

(...)

5. Professional users shall conduct regular calibrations and technical checks

of the pesticide application equipment in accordance with the appropriate training.

	24.11.2009	
	Official Instant	
1	Journal of the European Union	
1	1 109/21	
1	Dine	- 1
1	DIRECTIVES	
L	DIRECTIVE MOD	
1	2009/128/EC OF THE EUROPEAN	1
	establishing a g of 21 October AND OF THE COMP	
	a tranework for Communication and a state of the COUNCIL	
	few whom to achieve the sustainable	
	THE EUROPEAN PARLIAMENT	1
	AND THE COUNCE OF THE	1
	other related Community	1
	Council Directive 79/409/EEC 2 and in particular	1
	92/43/EEC of 21 May birds (1, Conversion of wild birds (1, Conversion of the State	1
	Hundre Directive analy and of wild the conservation of	1
	of the Council of a the proposal from the of the formation of the Council of a the European price of the Eur	1
	manwork for Community averaging and a stabilities a	1
	Parliament and of the opinion of the second	1
	fed of nine evel of the surgean Economic and fed of nine evels of periods levels of periods.	1
	No 1107/2009 of head animal origin (1) and Revue	1
	Regions (7) regard to the opinion of the c	
	the Committee of the should also not praindly marker (*). These of plane	
	Acting in success of Regulations for Success in the Council	
	Article 251 of the Transce with the procedure into a construction (EQ) No 1698/1000 of the construction of	
	opmene (Eatron and Sectorian) of	
	Whereas: row Rutal Devel-	
	(i) In line	
	1600/2002/EC and 7 of Data achievement can play a main	
	Council of 22 July 2005 Parliament and of periode to operaticide. The use of the international of 22 July 2005	
	common lead faction beaution the Study areasing about the prime level should therefore be	
	use of pescildes though a chieving a sustained to be use who maintained while of pescildes though a sustained a sustained to	
	recautionary and preventive appropriate and rules. Friendle to the applicability of the	
(2)	a successful and the second seco	
	At present this Directive thould be the second seco	
	anticipated that the total apply to perticides (5) National Action Plant	
	exempled to cover blocidal products will be to reduce role anned at stering quantitative	
	health and the environment of periodic unter an indicators	
7	ine measures provided for in the management and introduction of encouraging the	
-	in order and oc alternative approaches or recharge approaches of rec	
0	C 161, 13.7.2007, p. 48.	
Op	Nino of Us 2007, p. 48. Should monitor the use of this Directive Memory of the state	
0	C 254 E. 7.10.2008 Common Postice 2007 (O) C 261	
OUT	among of 13 January 2000 (not up and Position of the Burrows () O(1 L 103, 25.4.1979, p. 1	
4 L	. 242, 10.9.2002, p. 1. (9) 1009 009 009 009 009 009 009 009 009 00	
	() See page 1 of dig OBL	
	1 / 09 L 277, 21.10.2005, p. I.	
-		

SPISE ADVICE manuals on in-farm self-inspection, maintenance and calibration

SELF-INSPECTION

SPISE 8



MAINTENANCE



CALIBRATION



SPISE standardized Procedure for the Inspection of Sprayers in Europe ADVICE

- Knapsack sprayers
- Field crop sprayers
- Fruit crop sprayers

Knapsack sprayers

- very popular (several milions sold yearly)
- used for majority of agrochemicals applied world wide
- posing high risk for the operator (direct exposure to spray plume and possible leaks)
- often of poor design and quality

SPISE 8

• seldom used with proper operator protection



DIRECTIVE 2009/128/EC

<u>Article 8</u>

SPISE 8

(...)

3. By way of derogation from *mandatory PAE inspections*, on the basis of a risk assessment and considering the scale of use Member States may exempt from inspection handheld pesticide application equipment or knapsack sprayers.

In this case the Member States shall ensure that operators have been informed of the need to change regularly the accessories, of the specific risks linked to that equipment, and that operators are trained for the proper use of that application equipment.



Knapsack sprayers

Main sources of risk for the operator and environment

- difficult or careless filling
- leakage

- improper dosing
- spray drift
- cleaning



Knaspack sprayers

Main sources of risk for the operator and environment

- difficult or careless filling
- leakage

SPISE 8

- improper dosing
- spray drift
- cleaning

can be minimized with technically fit sprayer

- correctly self-inspected
- well mainteined
- properly calibrated



SPISE ADVICE for self-inspection, maintenance and calibration of knapsack sprayers



- Lever operated
 - diaphragm
 - piston
- Compression



1. Introduction

SPISE 8

• Rationale

- ➢ requirement of SUD
- exemption from mandatory inspections

• Target audience

- users of knapsack sprayers
- ➢ farm managers,
- ➤ advisors,
- plant protection service supervisors
- providers of training
- Reference to EN ISO standards
 - requirements for new sprayers (19932-1)
 - verification methods (19932-2)
 - Inspection (19932-3)

CONTENTS

1. Introduction

SPISE 8

- Rationele
 - requirement of SUD
 - exemption from mandatory inspection
- Target audience
 - > users of knapsack sprayers
 - ➢ farm managers,
 - ➤ advisors,
 - plant protection service supervisors
 - providers of training
- Reference to EN ISO standards
 - requirements for new sprayers (19932-1)
 - verification methods (19932-2)
 - Inspection (19932-3)

2. Typical defects

• Troubleshooting table

Problems that defects may cause:

- leakage of spray liquid (PS)
- risk of spray drift (DS)
- reduced application quality

1. Introduction

SPISE 8

- Rationele
 - requirement of SUD
 - exemption from mandatory inspection
- Target audience
 - > users of knapsack sprayers
 - ➢ farm managers,
 - ➤ advisors,
 - Plant protection service supervisors
 - providers of training
- Reference to EN ISO standards
 - requirements for new sprayers (19932-1)
 - verification methods (19932-2)
 - Inspection (19932-3)

- 2. Typical defects
 - Troubleshooting table

Problems that defects may cause:

- leakage of spray liquid (PS)
- risk of spray drift (DS)
- reduced application quality
- 3. Maintenance
 - Regular cleaning
 - Parts wear
 - Parts replacement



1. Introduction

SPISE 8

- Rationele
 - requirement of SUD
 - exemption from mandatory inspection
- Target audience
 - users of knapsack sprayers
 - ➢ farm managers,
 - ➤ advisors,
 - Plant protection service supervisors
 - providers of training
- Reference to EN ISO standards
 - requirements for new sprayers (19932-1)
 - verification methods (19932-2)
 - Inspection (19932-3)

- 2. Typical defects
 - Troubleshooting table
 - Problems that defects may cause:
 - leakage of spray liquid (PS)
 - risk of spray drift (DS)
 - reduced application quality
- 3. Maintenance
 - Regular cleaning
 - Parts wear
 - Parts replacement

4. Operator safety

- Personal protection
- Sprayer cleaning



5. Self-inspection (inspection items put in form of questions)

- Before filling (visual assessment)
- 1) Harness

PISE 8

- 2) Tank
- 3) Strainer
- 4) Filter
- 5) Hose



Recommendation:

to be considered to modify or upgrade the sprayer by easy replacement of parts that may improve the work comfort and safety.

- After filling with water (visual assessment + functional test)
- 6) Readability of liquid level
- 7) Tightness
- 8) Pressure generation
- 9) Pressure regulator
- 10) Pressure gauge
- 11) Shut-off valve
- 12) Shut-off valve lock
- 13) Spray jet correctness

Lever operated sprayer

- 14) Pump functionality
- 15) Vent valve

Compression sprayer

- 16) Pump operation
- 17) Relief valve

5. Self-inspection (inspection items put in form of questions) - EXAMPLE

(4) Is the in-line filter on the pressure side clean and in good condition to prevent the nozzle from clogging?

Remove the filter insert from the housing installed between the device creating pressure and the shut-off valve controlling the flow of spray liquid to the nozzle (in most cases it is installed in the handle of spray lance) and closely examine it for cleanliness and damage caused by cracks, corrosion or deformation. Clean the filter if necessary.

Recommendation:

SE 8

The mesh width of the pressure filter should correspond with the size of orifice in the nozzle fitted on the spray lance.

SPISE ADVICE for self-inspection, maintenance and calibration of knapsack sprayers CONTENTS

6. Calibration



• If the sprayer with nozle(s) best appropriate for the intended application and fill the sprayer rank to about half full with clean water. • If the sprayer rank to about half full with clean water. • If the sprayer rank to about half full with clean water. • If the sprayer rank to about half full with clean water. • If the sprayer rank to about half full with clean water. • If the sprayer rank to about half full with clean water. • If the sprayer rank to about half full with clean water. • Provide field and bow crops use a measuring type to determine the nozel height (preferably abouts 0 or 0). • A. For solid field crops determine the spray e.g. contrable and effectives sprayer. • A. For solid field crops determine the the wetted area. • A. For solid field crops determine the tweet ages. • B. For ow crops determine the row spacing. • Put the sprayer on an even surface and add clean water into the tank. mutia a social able well (point crops (see 25 m). • Spray on the ground/crop at the set test distance trying to keep a constant walking speed, conscie distance (height) and liquid pressure (sumping action) as during the trial sprayme. • Spray volume g(L/ha) = <u></u>			PRAYER	KNAPSACK S	ATION OF	CALIBE		
Prime the sprayer and carry out a trial spraying in order to determine waking speed and distance between the notice[i] and the target to be kines during a conformable and effective spraying. Image: Conformable and effective spraying during a conformable and effective spraying. Prime the notice[i] and low crops use a measuring tape to determine the notice[i] and the traget to be kines (i] (e_g. concrets, solid) while keeping the notice[i] and measure the width of the worsted (i] (e_g. concrets, solid) while keeping the notice[i] and measure the width of the worsted (i] (e_g. concrets, solid) while keeping the notice[i] and measure the width of the worsted (iii) while the notice[i] of the worsted (iii) while the solid field crops of the worsted (iii) while the solid field crops of the solid field crops or now crops. Iii) Calculate the applied spray volume for either solid field crops or now crops. Iiii) Calculate the applied spray volume (L/ho] (iv) Spray or how service for spraying. Use a measuring iz to refit the tank up to the solid field crops or now crops. A. Solid field crops (e.g. trawherries, vegetables, vines, bushes, trees): Spray volume # (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Spray volume (L/he] = Volume of water used [I] (iv) Calculate the anount of the plant protection product (PPP) per tank. (iv) Spray volume (L/he] (iv) Calculate the anount		P	lication	or the intended applean water.	st appropriate f t half full with c	nozzle(s) be tank to abou	ne sprayer with fill the sprayer	Fit tl and
A for solid field crops determine the spray without the notice of the n	2	NOZZLE	×	ce	a trial spraying peed and distan arget to be kept ive spraying. a measuring ta eferably about S	and carry out ine walking s e(s) and the t ole and effect ow crops use the height (pr	e the sprayer a der to determi veen the nozzi- ng a comfortab solid field and I rmine the noz	Prim in or betw durin For s dete
 Put the sprayer on an even surface and add clean water into the tank unit a recognizable level (up to recognizable mark). Set a certain, measured test distance in the cope (g. 2.5 m). Use a long measuring tape and mark the beginning and the end points. Set a certain, measured test distance the rice op (g. 2.5 m). Use a long measuring tape and mark the beginning and the end points. Set a certain control distance in the cope (g. 2.5 m). Use a long measuring tape and mark the beginning and the end points. Set a certain control distance in the cope (g. 2.5 m). Check the volume of water used for spraying. Check the volume of water used for spraying. Check the splited storps volume for either solid field crops or row crops. A. Said field crops (e.g. Lwnn): Spray volume <i>u</i> [<i>U</i>/n] = <u>Volume of water used [<i>1</i>] Test distance [<i>m</i>] x Spray width [<i>m</i>] x 10 000</u> Rew crops (e.g. strawberries, vegetables, vines, bushes, trees): Spray volume <i>u</i> [<i>U</i>/n] = <u>Volume of water used [<i>m</i>] x 10 000</u> Calculate the amount of the plant protection product (PPP) per tank. PPP per tank [kg or <i>L</i>] = <u>Tonk volume [<i>1</i>] x Pesticide dose rate [kg or <i>L</i>/ne] Spray volume (kg or <i>L</i>] = <u>Tonk volume [<i>1</i>] x Pesticide dose rate [kg or <i>L</i>/ne]</u></u> TANK NOZZLE DISTANCE DISTANCE WATER USED ROW SPACING VOLUME pose RATE per (hall m) [h] [h] 	-	SPRAY WIDTH	K	Ō	the the spray the dry surface ig the nozzle(s) trial spraying, etted area. row spacing.	ops determines (s). Spray on while keepines d during the width of the we etermine the	or solid field or h of the nozzle concrete, soil e height as use measure the w or row crops do	A. Fe widt (e.g. at th and B. Fe
 Sta certain, measured test distance in the crop (e.g. 25 m). Use a long measuring tape and mark the beginning and the end points. Spray on the ground/crop at the set test distance trying to keep a constant walking speed, notice distance (height) and liquid pressure (sumpling action) as during the trial spraying. Check the volume of vater used (for psraying.) Calculate the applied spray volume for thether solid field crops or row crops. A. Solid field crops (e.g. tawn): Spray volume w [L/ha] = <u>Volume of water used [1]</u> spray volume w [L/ha] = <u>Volume of water used [1]</u> Test distance [m] x Spray wolume [1] x 10 000 B. Row crops (e.g. strawberrie, wegetables, vines, butset, tree): Spray volume w [L/ha] = <u>Volume of water used [1]</u> Test distance [m] x Row spocing [m] x 10 000 Calculate the amount of the plant protection product (PPP) per tank. PPP per tank [kg or L] = <u>Tank volume [1] x Pesticide dose rate [kg or L/ha]</u> Spray volume [L/ha] TANK NOZZLE <u>TEST</u> VOLUME of SPRAY WDTH/ DOSE RATE per tank [kg or L] = <u>Volume of water water [kg or L/ha]</u> Spray volume [L/ha] 			nk	an water into the ta ark).	ace and add clea recognizable ma	an even surf e level (up to	he sprayer on a recognizable	Put I until
 Gray on the ground/crop at the set test distance trying to keep a constant waking speed, noted distance (height) and link personse (pumping action) as during the trial spraying. Check the volume of water used for spraying. Check the volume of water used for spraying. Calculate the applied spray volume for either solid field crops or row crops. A. Solid field crops (e.g. lawns): Spray volume w (L/ha) = <u>Volume of water used [I]</u> × 10 000 B. Row crops (e.g. strawberries, vegetables, vines, bushes, trees): Spray volume w (L/ha) = <u>Volume of water used [I]</u> × 10 000 Calculate the amount of the plant protection product (PPP) per tank. PPP per tank (Fig or L) = <u>Tonk volume [I] × Persicide dose rate [Ig or L/ha]</u> TATE (Torta E) SPRAY volume [I/ha] TATE (VolumK e) SPRAY wolume [I/ha] Calculate the amount of the plant protection product (PPP) per tank. PPP per tank (Fig or L) = <u>Tonk volume [I] × Persicide dose rate [Ig or L/ha]</u> TATE (DISTANCE DISTANCE WATER USED ROW SPACING VOLUME DISTANCE DISTANCE WATER VISED ROW SPACING VOLUME [I/ha] 	5	<u>NOE</u>	ints.	p (e.g. 25 m). ling and the end po	tance in the crop mark the beginn	ured test dis	i certain, meas a long measuri	Set a
 On-ock the volume of vater used for spraying. Use a measuring jug to refill the tank up to the same level as before spraying. Calculate the applied spray volume for either solid field crops or ow crops. A. Solid field crops (e.g. tawns): Spray volume w [L/ha] = Volume of water used [J] For volume w [L/ha] = Volume of water used [J] Spray volume w [L/ha] = Volume of water used [J] Spray volume w [L/ha] = Volume of water used [J] Spray volume w [L/ha] = Volume of water used [J] Calculate the amount of the plant protection product (PPP) per tank. PPP per tank (Rg or L] = Tonk volume [L] × Pesticide does note [Rg or L/ha] Spray volume [L] has the column [L] × Pesticide does note [Rg or L/ha] Spray volume [L] has the column [L] × Pesticide does note [Rg or L/ha] TANK NOZZLE DISTANCE DISTANCE	_	king speed, I spraying.	onstant walk ring the trial	ce trying to keep a o mping action) as du	e set test distant id pressure (pu	d/crop at the light) and liqu	y on the groun le distance (he	G Spra
Calculate the applied spray volume for either solid field crops or row crops. A. Solid field crops (e.g. iswns): Spray volume u [L/h2] = <u>Volume of water used [1]</u> Freat distance [m] × Spray width [m] × 10 000 B. Row crops (e.g. strawberries, vegetables, vines, bushes, trees): Spray volume e [L/h2] = <u>Volume of water used [1]</u> Test distance [m] × Row spocing [m] You of the applied optimized (m) × Row spocing [m] Calculate the amount of the plant protection product (PPP) per tank. PPP per tank [kg or L] = <u>Tank volume [L] × Pesticide dose rate [kg or L/h2]</u> Spray volume [L/h2] TANK NOZZLE TEST VOLUME of SPRAY WIDTH/ Spray volume [L] Spray volume [L/h2] Pesticide for the plant protection product (PP) per tank. Per tank [kg or L] = <u>Tank volume [L] × Pesticide dose rate [kg or L/h2]</u> DOSE NATE: per lank NOZILE DISTANCE DISTANCE DISTANCE DISTANCE VALTER VSD NOW SPACING VOLUME [L] VOLUME [L] Interview (m) Interv			spraying.	same level as befor	for spraying. tank up to the :	of water used g to refill the	k the volume of a measuring ju	7 Chee Use
Spray volume w [L/ha] = Volume of water used [L] x 10 000 B. Row crops (a.g. strawberries, vegetables, vines, bushes, trees): Spray volume x [L/ha] = Volume of water used [L] Spray volume x [L/ha] = Volume of water used [L] x 10 000 Calculate the amount of the plant protection product (PPP) per tank. PPP per tank [kg or L] = Tank volume [L] × Pesticide dose rate [kg or L/ha] Spray volume [L] NOZZLÉ TEST VOLUME DISTANCE WATER USED ROW SPACING VOLUME Inal Inal Inal			w crops.	lid field crops or ro	me for either so ns):	ed spray volu ops (e.g. law	solid field cr	B Calc
Spray volume &: [L/ha] = Volume of water used [L] 10 000 Saculate the amount of the plant protection product (PPP) per tank. PPP per tank [kg or L] = Tank volume [L] × Perticide dose rate [kg or L/ha] Spray volume L[L] = Volume of SPRAY WOLTH NOZZLE TANK NOZZLE DISTANCE			7 × 10 000	water used [L] n] x Spray width [m vines, bushes, tree	Volume oj Test distance (r ries, vegetables,	sr [L/ha] = −	Spray volume	в.
Calculate the amount of the plant protection product (PPP) per tank. PPP per tank (kg or L) = <u>Tank volume [L] x Pesticide dose rate [kg or L/ho]</u> Seray volume [L/ho] TANK NOZZLÉ DISTANCE VOLUME of SPRAY WORTH/ SPRAY POSITIONE DISTANCE WATER USED ROW SPACING VOLUME DISTANCE TANK WATER USED ROW SPACING VOLUME DISTANCE TANK Int Int Int Int Int Int Int Int Int		, 000		f water used [L] n] x Row spacing [n	Volume oj Test distance (n	nc [L/ha] = -	Spray volume	
PPP per tank (kg or L) = Tank volume [L] * Perticide dote rate [kg or L/ho] Spray volume [L]/ho] Spray volume [L]/ho] TANK NOZZLE TEST VOLUME DISTANCE WATER USED ROW SPACING VOLUME DOSE RATE III [m] [m] [1]	-	Ren a	k.	oduct (PPP) per tar	nt protection pr	int of the pla	ulate the amou	Galo
TANK NOZZLE TEST VOLUME of SPRAY WIDTH/ SPRAY PESTICIDE P VOLUME DISTANCE DISTANCE WATER USED ROW SPACING VOLUME DOSE RATE per [1] [m] [1] [m] [1]/(ba) [her or 1/ba] [her or 1/ba]			te [kg or L/ho	x Pesticide dose ra pray volume [L/ha]	Tank volume [L] S	[kg or L] = -	PPP per tank	
[1] [m] [m] [1] [m] [1/ba] [ke or 1/ba] [ke	PPP er TANK	PESTICIDE PP DOSE RATE per T	SPRAY VOLUME	SPRAY WIDTH/ ROW SPACING	VOLUME of WATER USED	TEST DISTANCE	NOZZLE DISTANCE	TANK VOLUME
tel foit foit foit foit foit foit foit foit	kg or L]	[kg or L/ha] [kg o	[L/ha]	[m]	[L]	[m]	[m]	[L]

- Filling with clean water
- Trial application on defined distance
- Measuring spray width
- Measuring water volume used
- Calculating spray volume rate
- Calculating amount of **PPP per tank**



SPISE ADVICE for self-inspection, maintenance and calibration of knapsack sprayers

CONTENTS

EXAMPLE: for solid field and row crops

6. Calibration

SPISE 8



		CALIBR	RATION OF	KNAPSACK S	PRAYER		-
Fit th and	he sprayer with fill the sprayer	tank to abou	est appropriate f it half full with c	or the intended ap lean water.	plication		4
2 Prim in or betw durin For s dete	the the sprayer : ader to determi- ween the nozzion of a comfortab solid field and l armine the nozzion	and carry out ine walking s e(s) and the t ole and effect ow crops use the height (pr	a trial spraying peed and distan arget to be kept ive spraying. a measuring ta eferably about 5	pe to 50 cm).	\prec	HEIGHT	22
A. Fo widt (e.g. at th and B. Fo	or solid field cr h of the nozzle concrete, soil) se height as use measure the w or row crops de	ops determin (s). Spray on while keepin ed during the vidth of the w etermine the	the the spray the dry surface of the nozzle(s) trial spraying, retted area. row spacing.	0	r f	SPRAY	
Put t until	the sprayer on a recognizable	an even surf e level (up to	ace and add clea recognizable m	an water into the ta ark).	ink	0	·
Use Use	a long measuri	ng tape and	mark the beginn	ing and the end po	ints.		
6 Spra nozz	y on the groun le distance (he	id/crop at the ight) and liqu	e set test distant aid pressure (pu	ce trying to keep a mping action) as de	constant wal	king speed, I spraying.	
Chec Use	ck the volume of a measuring ju	of water used g to refill the	for spraying. tank up to the :	same level as befor	e spraying.		
B Calco A.	Solid field cr	ed spray volu ops (e.g. law	me for either so ns):	lid field crops or ro	w crops.	l	
	Spray volume	y [L/ha] = —	Volume oj Test distance (r	f water used [L] m] x Spray width [n	n] × 10 000	, F	
в.	Row crops (e	e.g. strawber	ries, vegetables,	vines, bushes, tree	es):	4	
	Spray volume	к [L/ha] = —	Volume oj Test distance (n	f water used [L] n] x Row spacing [n	n] × 10 000	,	
9 Calc	ulate the amou	unt of the pla	nt protection pr	oduct (PPP) per tar	nk.	Ker	-
	PPP per tank	[kg or L] = -	Tank volume [L] S	x Pesticide dose ra pray volume [L/ha]	ite (kg or L/h	<u>a</u>	
TANK	NOZZLE	TEST	VOLUME of	SPRAY WIDTH/	SPRAY	PESTICIDE DOSE BATE	PPP per TANK
[L]	[m]	[m]	[L]	[m]	[L/ha]	[kg or L/ha]	[kg or L]

0	A. Solid field of The 8 L sprayer	fitted with flat	ontrol on lawn t-fan nozzles 02.	E	he 12 L sp	op – Pest con rayer fitted w	trol in berry pla ith hollow cone	nozzle 03.
9	A horizontal bo carry out a trial maintaining the the constant pr	om with 3 noz I spraying on la e constant wall ressure in the s	zles is used to wn while king speed and ystem.	Th of w sy	ne berry bu I spray land alking spee stem.	ushes are spra ce while main ed and the co	ived by even mo taining the cons nstant pressure	ovements tant in the
	The measured	NOZZLE HEIGH	T is 50 cm.	Trike	ne distance opt to even	between the ly cover the t	a nozzle and the arget by spray.	bush is
8	The measured	SPRAY WIDTH	is 1,50 m.	Π	ne measure	ed ROW SPAC	CING is 3 m.	
0	The sprayer tar up to the mark	k is filled with of nominal vol	water precisely ume, 8 L.	T? th	he sprayer Ie mark ind	tank is filled v	with water prec	isely up to
9	The TEST DIST/	ANCE on the la	wn is <mark>2</mark> 5 m .	T	ne TEST DI	STANCE on th	e bush row is 1	0 m.
6	The lawn is spr	ayed at the tes	t distance 25 m.	TP	ne 10 m of	bush row is s	prayed on both	sides.
0	The measured	VOLUME of W	ATER USED is 0,7	5L T	he measure	ed VOLUME o	WATER USED	is 1,80 L
8	The applied SP A. for lawn:	RAY VOLUME	is calculated as f	ollows:				
	SPR.	AY VOLUME =	0,75 L 25 m x 1,50	<i>m</i> ×	10 000 =	200 L/ha		
	B. for berry p	antation:						
	SPR	AY VOLUME =	1,80 L 10 m x 3 n	, ×	10 000 =	600 L/ha		
9	The amount of	the PLANT PR	OTECTION PROD	UCT (PP	P) per TAN	VK is calculate	ed as follows:	
	A. herbicide	DOSE RATE =	0,8 L/ha		B. i	nsecticide DC	SE RATE = 0,4 L	/ha
	PPP per TANK =	8 L x 0,8 L, 200L/ho	/ha = 0,032		PPP per T	ANK = 12 L	x 0,4 L/ha 00 L/ha =	0,008 L
TAN VOLUI	K NOZZLE ME DISTANCE	TEST DISTANCE	VOLUME of WATER USED	ROW	(WIDTH/ SPACING	SPRAY VOLUME	PESTICIDE DOSE RATE	PPP per TAN
[L]	[m]	[m]	{L]		[m]	[L/ha]	[kg or L/ha]	[kg or l
A. 8	0,5	25	0,75	1	,50	200	0,8	0,032

Table of Nozzle Flow Rate

7. Nominal nozzle flow table

E

Nominal flow rates of the most commonly used sizes of nozzles More details about the nozzles, including information on the recommended pressure ranges and size of generated droplets, can be found in nozzle catalogues offered by the nozzle manufacturers or available on their websites.

Pressure	Nozzle size								
bar	01	015	02	025	03	04	05	06	
1,5	0,28	0,42	0,57	0,70	0,85	1,13	1,41		
2,0	0,33	0,49	0,65	0,81	0,98	1,31	1,63	1,96	
2,5	0,37	0,55	0,73	0,91	1,10	1,46	1,83	2,19	
3,0	0,40	0,60	0,80	1,00	1,20	1,60	2,00	2,40	

SPISE ADVICE for self-inspection, maintenance and calibration of knapsack sprayers

FOLDED LEAFLET FOR SPRAYER USERS handy instruction on self-inspection & calibration

SPISE 8

6001/1

Check-list (inspection items)

- Calibration table
- **Calibration example**
- Nozzle flow rate table

SPISE ADVICE CHECK-LIST

On-farm self-inspection and calibration of the knapsack sprayer *

Use personal protection equipment: coverall, gloves, boots, protective glasses or face shield

BEFORE FILLING

- □ Is the sprayer harness complete and in good condition to ensure safe carrying of a loaded sprayer ?
- □ Is the sprayer tank undamaged to keep it tight when filled with water?
- Is the strainer in the sprayer's tank opening or other type of filling filter clean and in good condition to prevent coarse dirt from entering the tank?
- Is the in-line filter on the pressure side clean and in good condition to prevent the nozzle from clogging?
- □ Is the liquid hose in good condition, not damaged, not bended and securely connected to avoid leakages?

AFTER FILLING WITH CLEAN WATER

- □ Is the sprayer's nominal capacity and liquid level clearly readable?
- Is the sprayer, when filled with water to its nominal capacity, maintaining a tight seal when at rest, when put on by the operator and operating under pressure?
- □ Is the pump working properly to produce adequate liquid pressure?
- □ Is the pressure regulator operating properly to enable appropriate adjustment of liquid flow?
- □ Is the pressure gauge indicating pressure to appropriately control spray application?
- □ Is the response of shut-off valve immediate upon opening and closing
- □ Is the shut-off valve capable of being reliably locked to avoid unintentional opening?
- Is the shape of spray jet produced by the nozzle correct, i.e. as specified by the sprayer or nozzle manufacturer?

Lever operated sprayer

- □ Is the pump lever securely connected and operating unhindered, i.e. without excessive resistance?
- □ Is the vent valve or other device for pressure compensation letting the air into the tank when the liquid level drops during spray application?

Compression sprayer

- □ Is the pump piston operating without any problem, i.e. moving smoothly?
- □ Is the relief valve opening to let the air out when the pressure exceeds the maximum value?

This check-list of the self-inspection procedure is to be used as an example that may be subject to
modifications according to local legislation or conditions. A detailed instruction is available on: www......



DIRECTIVE 2009/128/EC

<u>Article 8</u>

 Member States shall ensure that pesticide application equipment in professional use shall be subject to inspections at regular intervals.

After 2020 the interval between inspections shall not exceed <u>three years</u>.

2. New equipment shall be inspected at least once within a period of <u>five years</u> after purchase.

24.11.2009	IN	
	Official Jo	Ournal of the Furner
		the European Union
		L 309/71
		DIRECTIVE
		- MECTIVES
Di	RECTIVE 2009/1 20/0	
	128/EC OF THE EU	ROPEAN BAR
establ	ishine a france of 2	October MALIAMENT AND OF THE COUNTY
	a tramework for Community	Y artice
	(Tear -	school to achieve the sustainable use of
EUROPEAN UNION,	IMENT AND THE COUNCIL OF THE	nan PEA relevance) and use of pesticides
		other related Comm
Having regard to the Community, and in partic Having regard to the prop	Treaty establishing the European ular Article 175(1) thereof, stal from the Commission,	Council Directive standards y deplation, in particular conservation of '10/05/EC of 2 April 1979 on the 92/43/IEC of 21 wild butch (*), Council Directive manual Jubiana May 1992 on the conservation of Directive 3000/000, and of wild famat and flora (*), of the Council of of the Furspace Tablantee and framework for Core 23 October 2000 Parliament and policy (*), Recolumnentity: action in the auxibiliting a
Social Committee (1), Having regard to the opin Regions (7),	on of the European Economic and	ratianes and aron (EC) No 196/200 - see of the European maximum reads of the Council of 21 forbiary 2003 on feed of plans and levels of pesticides (abruary 2003 on No 1107/2009 of sime Suropean Paulas Regulation (EC) Council of 21 Council of the European Paulas Regulation (EC) protection products on the market plans and of the protection products on the market plans and plans thould also nor (Baco Philose Volumary mode market Council of Reso Philose Volumary mode market
Acting in accordance with Article 251 of the Treaty (7), Whereat:	ebe procedure laid down in	Council Regulation of Structural Funds to of 20 Supermise 2005 on support for rural development by the European Agricultural Fund for Rural Devel-
(1) In line with Articles 1 1600/2002/EC of the Eun Council of 22 July 20 Community Environment common legal framework use of percivice should be of preclusionary and preven	and 7 of Decision No opean Parliament and of the 2 laying down the Sith Action Programmers, a for achieving a marchinable established, taking account the approaches.	(9) Economic interuments can play a crucial role in the achievement of objectives relating to the statisticable and of passicides. The use of such instruments at a display prise with a individual. Member 2 states can device a statistic their use whohen prejudice so the applicability of the Same aid rules.
As present, this Directive s which are plant protection anticipated that the scope of extended to cover blocidal pro	bould apply to persicides (5) produces. However, it is of this Directive will be duces.	National Action Plans aimed at sensing quantitative operative, surgert, measurer, simetables and indicators health are risk and impact of the
The measures provided for in complementary to, and not affect C 161, 13.2007, p. 48. 064, 106.2007, p. 44. 0.000, p. 41. 0.000,	this Directive should be t measures laid down in Gradeer 300° (GT C 241 Testion of 19 Mar 2000 GT 19 Mar 2000 GT 01 Mar 2	The second of the environment of precision use on the environment prevalence and interaction of integrated the integration of the environment of the environment integration of the environment of the environment of the environment of the environment the information of the environment of precision the environment of precision protection produces the environment of precision protection to an environment of precision protection to an environment of precision protection 101, 214, 1075, p. 1. 207, 221, 2080, p. 1. 2080, p. 1. 2080



High risk of failures and malfunctions

- worn, clogged, damaged nozzles,
- leakages,

- leaking anti-drip valves,
- defective manometers,
- damaged or deformated filters.



Regular self-inspections, good maintenance and proper calibration are needed to:

- ensure top technical performance and reliable operation of PAE
- minimise risk posed to the operator and environment
- learn about the machines and demands imposed on them
- gain useful skills in case of emergency or repair

SPISE 8

• enable appropriate preparation of machines for the successful mandatory inspection.

SPISE 8

SPISE ADVICE for self-inspection, maintenance and calibration of field crop sprayers



CONTENTS

1. Introduction

SPISE 8

Rationale

- requirement of SUD
- Iong intervals between inspections

• Target audience

- users of sprayers
- ➤ farm managers,
- ➤ advisors,
- plant protection service supervisors
- providers of obligatory training

• Reference to EN ISO standards

- requirements for new sprayers (16119-1)
- verification methods (19932-2)
- Inspection (16122-1,2)

1. Introduction

SPISE 8

- Rationele
 - ➢ requirement of SUD
 - Iong intervals between inspections
- Target audience
 - users of knapsack sprayers
 - ➢ farm managers,
 - ➤ advisors,
 - plant protection service supervisors
 - ➢ providers of obligatory training
- Reference to EN ISO standards
 - requirements for new sprayers (16119-1)
 - verification methods (19932-2)
 - Inspection (16122-1,2)

CONTENTS

2. Typical defects

- Consequences of sprayer defects
 - environmental contamination
 - unsatisfactory efficacy

1. Introduction

SPISE 8

- Rationele
 - requirement of SUD
 - Iong intervals between inspections
- Target audience
 - users of knapsack sprayers
 - ➢ farm managers,
 - ➤ advisors,
 - plant protection service supervisors
 - providers of obligatory training
- Reference to EN ISO standards
 - requirements for new sprayers (16119-1)
 - verification methods (19932-2)
 - Inspection (16122-1,2)

CONTENTS

- 2. Typical defects
 - Consequences of sprayer defects
 - environmental contamination
 - unsatisfactory efficacy

3. Maintenance

- Regular cleaning
- Tank
- Pump
- Filters
- Pipes and hoses
- Spray boom
- Nozzles



1. Introduction

SPISE 8

- Rationele
 - requirement of SUD
 - Iong intervals between inspections
- Target audience
 - users of knapsack sprayers
 - ➢ farm managers,
 - ➤ advisors,
 - plant protection service supervisors
 - providers of obligatory training
- Reference to EN ISO standards
 - requirements for new sprayers (16119-1)
 - verification methods (19932-2)
 - Inspection (16122-1,2)

CONTENTS

- 2. Typical defects
 - Consequences of sprayer defects
 - environmental contamination
 - unsatisfactory efficacy

3. Maintenance

- Regular cleaning
- Tank
- Pump
- Filters
- Pipes and hoses
- Spray boom
- Nozzles

4. Operator safety

- Personal protection
- Sprayer cleaning



CONTENTS

5. Self-inspection (inspection items put in form of questions)

- Before starting the sprayer
- 1) Attaching to tractor
- 2) Tank lid

PISE 8

- 3) Strainer
- 4) Readability of liquid level
- 5) Drain valve
- 6) Pump lubrication
- 7) Filters
- 8) Nozzles
- 9) Nozzle filters



- After starting the sprayer
- 10) Spray boom protection
- 11) Spray boom operations
- 12) Breakaway mechanism
- 13) Boom stabilisation & damping
- 14) Tightness
- 15) Valves
- 16) Pressure gauge
- 17) Pressure stablity

Recommendation: to be considered to modify or upgrade the sprayer by easy replacement of parts that may improve the work comfort and safety.

- 18) Pressure repeatability
- 19) Pressure compensation
- 20) Agitator
- 21) Self-spraying
- 22) Spray jet quality
- 23) Anti-drip valves
- 24) Fan and air sleeve
- 25) Filling and cleaning accesories

CONTENTS

5. Self-inspection (inspection items put in form of questions) - EXAMPLE

(5) Is the drain valve working properly?

Check that opening the drain valve allows unobstructed emptying the tank and that the valve is tight when closed.

Recommendation:

ISE 8

The drain valve should enable collecting the liquid drained from the tank without exposing the operator to contamination and without posing risk for the environment.

SPISE ADVICE for self-inspection, maintenance and calibration of field crop sprayers CONTENTS

6. Calibration



growth phase and the type of sprayer. Check the nozzle spacing on the spray boom. Calculate the travel speed of the sprayer based on the measurement of the travel time (t) on a defined distance (d) (min. 50 m). Calculate the travel speed of the sprayer based on the measurement of the travel time (t) on a defined distance (d) (min. 50 m). Trovel speed [km/h] = Driving distance [n] based is used in the sprayer based is used in the sprayer based is used in the sprayer based is used in the sprayer based is used in the spray volume at the calculated operating speed, or use the nozzle catalogue / calibration disc. Nozzle flow rate [L/min] = Spray volume [L/ha] x Nozzle specing [m] x Trovel speed [km/h] 600 Install the selected nozzles, start the sprayer and set the nominal pressure, sprayed out over one minute. Repeat the measurements for a few on each sectual does of the obtained result and the resulted flow, correct the pressure and repeat the measurement. Make the records of the obtained results in the table below. Not the table of the nominal nozzle flow rate tab the nominal pressure, or neach sectual does of the notath the required flow; correct the pressure and repeat the measurement. Make the records of the obtained results in the table below. Not the table of the nominal nozzle flow rate to the table below. Not the the result does not match the result of flow match the regulared flow; correct the pressure and repeat the measurement. Make the records of the obtained results in the table below. Not	growth phase and the type of sprayer. Check the nozzle spacing on the spray boom. Calculate the travel speed of the sprayer based on the measurement of the travel time (t) on a defined distance (d) (min. 50 m). Trovel speed [km/h] = Driving distance [m] Spray distance (m] Check the nozzle flow rate to apply the spray volume at the calculated operating speed, or use the nozzle catalogue / calibration disc. Nozzle flow rate [L/min] = Spray volume [L/ma] × Nozzle spacing (m] × Travel speed [m] Nozzle flow rate [L/min] = Spray volume [L/ma] × Nozzle spacing (m] × Travel speed [m] Nozzle flow rates (see nozzle catalogue), select the noz and the pressure for which the flow rates is closes to the one calculated above.	
Check the nozzle spacing in the spray boom.	here the nozzle spacing check the nozzle spacing basic of the spray boom. Calculate the travel speed of the spray re- time (I and interment of the travel time (I and I and	85 90 42 40
Calculate the travel speed of the sprayer based on the measurement of the travel time (t) on a defined distance (d) (min. 50 m). Travel speed [km/h] =	Calculate the travel speed of the sprayer based on the measurement of the travel time (t) on a defined distance (d) (min. 50 m). Travel speed [km/h] = $\frac{Driving distance [m]}{Driving time [s]} \times 3,6$ $\frac{1000}{2 \text{ km}} \times $	85 90 42 40
$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} $	travel speed [km/h] = $\frac{Driving distance [m]}{Driving time [s]} \times 3,6$ $\frac{y_{10}m}{p_{10}m} = \frac{6}{60} \frac{41}{10} \frac{10}{10} \frac{13}{10} \frac{14}{10} \frac{16}{10} \frac{10}{10} \frac{10}{10} \frac{12}{10} \frac{14}{10} \frac{16}{10} \frac{10}{10} \frac{12}{10} \frac{14}{10} \frac{16}{10} \frac{10}{10} \frac{12}{10} \frac{14}{10} \frac{16}{10} \frac{10}{10} \frac{12}{10} \frac{14}{10} \frac{16}{10} \frac{10}{10} \frac{10}{10} \frac{12}{10} \frac{16}{10} \frac{10}{10} \frac{10}{10}$	85 90 4,2 4,0
Signed	$\frac{1}{100} \frac{1}{10} $	85 90 4,2 4,0
at tech top 125 22 64 64 24 56 55 55 55 50 07 64 62 66 65 55	a tech top 72 72 92 62 62 62 63 55 53 53 50 60 60 Calculate the required nozzle flow rate to apply the spray volume at the calculated operating speed, or use the nozzle catalogue / calibration disc. Nozzle flow rate [L/min] = 600 In the table of the nominal nozzle flow rate is closet to the one calculated above, and the pressure for which the flow rate is closet to the one calculated above.	42 40
Calculate the required nozzle flow rate to apply the spray volume at the calculated operating speed, or use the nozzle catalogue / calibration disc. Image: Comparison of the calculated operating speed, or calibration disc. Nozzle flow rate [L/min] = Spray volume [L/ha] x Nozzle spacing [m] x Travel speed [km/h] 600 In the table of the nominal nozzle flow rates (see nozzle catalogue), select the nozzles and the pressure for which the flow rate is closest to the one calculated above. Install the selected nozzle, start the sprayer and set the nominal pressure, sprayed out over one minute. Repeat the measurements for a few on each settid dees not match the required flow, correct the pressure and repeat the measurement. Make the records of the obtained resuls in the table below. WM MozZIS Make the records of the obtained resuls in the table below.	Calculate the required nozzle flow rate to apply the spray volume at the calculated operating speed, or use the nozzle catalogue / calibration disc. Nozzle flow rate [L/min] = Spray volume [L/ha] × Nozzle spacing [m] × Travel speed [L 600 In the table of the nominal nozzle flow rates (see nozzle catalogue), select the nor and the pressure for which the flow rates (see nozele catalogue), select the nor inter the selected explore, cred the presented of the normal neorem.	-
In the table of the nominal nozzle flow rates (see nozzle catalogue), select the nozzles and the pressure for which the flow rate is closest to the one calculated above. Install the selected nozzles, start the sprayer and set the nominal pressure, read in the table. Using a measuring jag, measure the volume of water sprayed out over one minute. Repeat the measurements for a few on each section and if the result does not match the required flow, correct the pressure and repeat the measurement. Make the records of the obtained results in the table below. WW NOZZLES TRACTOR SPELD CHCK IN SPEC Gear RePM Durance Time SPELD CHCMINTD CACULATED FLOW PARE PRESSURE Name State Gear RePM Durance Time Knyh Uman State SPELD Now PARE PRESSURE Now PARE PRESSURE NOTE PRESSURE NOTE PRESSURE NOTE PRESSURE NOTE PRESSURE NOTE PRESSURE NOTE PRESSU	In the table of the nominal nozzle flow rates (see nozzle catalogue), select the nor and the pressure for which the flow rate is closest to the one calculated above.	km/h]
Install the selected nozzles, start the sprayer and set the nominal pressure, sprayed out over one minute. Repeat the measurements for a few on each section and if the result does not match the required flow, correct the pressure and repeat the measurement. Make the records of the obtained results in the table below. Number of NOZZITS TINCTOR SPELD OIRCK CANOLATED OCCUPATED OIRCK PRESSURE PRESSURE PRESSURE TRAVE PRESSURE PRESSURE TRAVE PRESSURE PRESSURE TRAVE PRESSURE PRESSURE PRESSURE TRAVE PRESSURE	Install the celected possies, start the sprayer and set the pominal pressure	zles
Make the records of the obtained resuls in the table below. WW NOZZIES TRACTOR SPEED OFECK CACULATED SPEED OFECK CACULATED SPEED OFECK CACULATED FLOW FARE PRESSURE Mail Spacing Type Gear RPM Detaace Time SPEED OFECK S	read in the table. Using a measuring jag, measure the volume of water sprayed out over one minute. Repeat the measurements for a few on each section and if the result does not match the required flow, correct the pressure and repeat the measurement.	
RAV Interpretation TRACTOR SPEED OFFICE CALCULATED OFFICE CALCULATED OFFICE Mate ma Spacing Size Type Gear RPM rew/min Distance Time m Speed s FLOW RATE PRESSUR	Make the records of the obtained resuls in the table below.	
Tha spacing type Gear RVM Ustance Time m Size Gear rev/min m s km/h U/min bar	RAY NOZZLES TRACTOR SPEED CHECK CALCULATED CALCULATED LUME SPEED FLOW RATE	PRESSURE
	ha spacing type Gear rev/min m s km/h V/min	bar

- Filling with clean water
- Spray volume to be applied
- Measuring nozzle spacing
- Determining travel speed
- Calculating required nozzle flow
- Selecting nozzle & pressure
- Verification of nozzle flow

SPISE ADVICE for self-inspection, maintenance and calibration of field crop sprayers

CONTENTS



SPISE 8

6. Calibration

A winter wheat is to be sprayed at spray volume 150 L/ha. 2 The nozzle spacing is 0,5 m. The tractor with sprayer covered a distance 0 3 of 50 m in 25 seconds 25 : It was driven at the 3rd gear and 1600 RPM The travel speed is calculated as follows: - x 3,6 = 7,2 km/h Travel speed = -25 4 The nozzle flow rate needed to apply the spray volume 150 L/ha at travel speed 7,2 km/h is calculated as follows: 150 L/ha x 0,5 m x 7,2 km/h Nozzle flow rate = = 0.9 L/min 600 The selected nozzle size is 025 of which nominal flow rate 5 0,91 L/min (closest to the calculated one) is obtained at 2,5 bar. At the 2,5 bar set on the pressure gauge the actual flow rate Ø 6 of the 025 nozzles is only 0,8 L/min. The repeated measurement at 3,0 bar read on the pressure gauge results in the required flow rate 0,9 L/min. The results of calibration are recorded in the table below. SPEED CHECK CALCULATE CALCULATED FLOW RATE RESSUR SPEED bar km/h Vmin 2,5 0.5 025 50 7.2 150 3 1600 25 0.9 3

Table of Nozzle Flow Rate

Nominal flow rates of the most commonly used sizes of nozzles

Pressure				Nozzl	e size			
bar	01	015	02	025	03	04	05	06
1,5	0,28	0,42	0,57	0,70	0,85	1,13	1,41	1,70
2,0	0,33	0,49	0,65	0,81	0,98	1,31	1,63	1,9
2,5	0,37	0,55	0,73	0,91	1,10	1,46	1,83	2,1
3,0	0,40	0,60	0,80	1,00	1,20	1,60	2,00	2,40
4,0	0,46	0,69	0,92	1,15	1,39	1,85	2,31	2,7
5,0	0,52	0,77	1,03	1,28	1,55	2,07	2,58	3,1
6,0	0,57	0,84	1,11	1,40	1,64	2,21	2,75	3,2
7,0	0,61	0,90	1,19	1,52	1,79	2,37	2,96	3,54
8,0	0,65	0,96	1,27	1,62	1,91	2,53	3,17	3,7

More details about the nozzles, including information on the recommended pressure ranges and size of generated droplets, can be found in nozzle catalogues offered by the nozzle manufacturers or available on their websites.

EXAMPLE

EXAMPLE OF FIELD CROP SPRAYER CALIBRATION

SPISE ADVICE for self-inspection, maintenance and calibration of field crop sprayers

FOLDED LEAFLET FOR SPRAYER USERS handy instruction on self-inspection & calibration

SPISE 8

- Check-list (inspection items)
- Calibration table
- Calibration example
- Nozzle flow rate table

SPISE ADVICE

On-farm self-inspection, maintenance and calibration of the field crop sprayer *

Use personal protection equipment: coverall, gloves, boots, protective glasses or face shield
 Connect the sprayer to the tractor and fill it with clean water to half the volume of the tank.

BEFORE STARTING THE SPRAYER

- □ Is the sprayer connected safely to the tractor?
- Is the tank lid in good condition and properly fitted to prevent contamination due to loss of spray liquid ?
- Is the strainer in the sprayer's tank opening clean and in good condition to prevent coarse dirt from entering the tank?
- Is the spraver's tank nominal volume and liquid level clearly readable?
- □ Is the drain valve working properly?
- □ Is the pump properly lubricated (oil level, greasing)?
- Are all filters clean and in good condition?
- Are the nozzles properly fitted in the intended order/configuration
- Are the nozzles and nozzle filters clean and in good condition?

AFTER STARTING THE SPRAYER

- Is the spray boom properly protected from uncontrolled unfolding?
 Are the mechanisms of raising and unfolding of the spray boom working properly?
- □ Is the breakaway mechanism of the spray boom working properly?
- Are the boom damping and stabilization systems working properly?
- Are the tank and other components of liquid system tight and prevent leaks?
- Are pressure regulation valve, main shut-off valve, section valves and manifold valves working properly?
- □ Is the pressure gauge responding to pressure adjustment
- □ Are the indications of pressure gauge stable?
- □ Are the indications of pressure repeatable after turning the main shut-off valve on and off?
- Is the pressure constant after turning selected section valves on and off?
- □ Is the agitator causing visible water movement in the tank?
- Are the sprayer components protected from self-spraying?
 Are the spray jets produced by the nozzles even, with no signs of damage?
- Are the anti-drip valves working properly?

Air-assisted sprayer

Are the fan and air sleeve on in good condition?

<u>Extra equipment</u>

- Are the installations and devices for filling and cleaning of sprayer working properly?
- This check-list of the self-inspection procedure is to be used as an example that may be subject to modifications according to local legislation or conditions. A detailed instruction is available on: www.

FOLDED LEAFLET FOR SPRAYER USERS

SPISE 8

handy instruction on self-inspection & calibration



Final conclusions for carrying out the in-farm self-inspections of sprayers

- meaningful risk miitgation measure
- on yearly basis

- visual and simple functional check
- preferably at the start of plant protection season
- as a good practice before calibration of the equipment
- with basic tools and the standard calibration kit



SPISE ADVICE manuals on self-inspection of PAE are meant to:

- propose a harmonized procedure of regular calibration and technical checks
- support implementation of Art. 8 of SUD

- meet requirement for training/information
- stimulate voluntary activities for complete adoption of SUD







thank you ;-)