



United States  
Department of  
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National  
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Statistics  
Service



# Agricultural Chemical Usage 2000 Sheep and Sheep Facilities

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# USDA



## 2000 Agricultural Chemical Use Estimates for Sheep and Sheep Facilities

**Overview:** The agricultural chemical use estimates in this report are based on data compiled from a survey conducted in late December 2000 through January 2001 in 22 selected States. These States account for approximately 87% of the U.S. sheep inventory published by NASS. Only those States with published sheep inventory for January 1, 2001 were used for this calculation.

This report provides insecticide use information on sheep and sheep facilities in the 22 selected States. All data refer to the on-farm use of chemical active ingredients contained in insecticides which were applied during the 2000 calendar year. Insecticides are defined as chemical products used for the control of insects. Insecticides are regulated by the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). Insecticides are applied to sheep and sheep facilities to control mange, mites, lice, flies, keds, bots, and other external pests.

Chemical usage on sheep is provided on a rate per head per application and rate per head per year basis. Some sheep received no chemical applications in 2000; whereas, other sheep and lambs received multiple applications of the same chemical. In other cases, sheep received applications of several different chemicals. The number of times a chemical is applied varies significantly based on product formulation, method of application, and pest stress at particular locations. The rate per head data cannot be used to calculate the actual number of head treated with a particular chemical. Sheep and lamb inventories are reprinted in this report from a previous NASS release. This table is included for informational purposes only.

Some active ingredients, such as petroleum distillate, piperonyl butoxide, and xylene are primarily carriers, diluents, synergists, or repellents. These active ingredients are classified by the EPA as pesticides, and are therefore included in this report.

This report excludes pharmaceutical products that treat sheep for internal pests. A pharmaceutical is classified as a drug and is regulated by FDA. Pharmaceuticals generally target internal livestock pests such as viruses, bacteria, or worms. Some products can be classified as either a pesticide or a pharmaceutical because they treat both external and internal pests. Examples of dual purpose products are Doramectin and Ivermectin. These products can be applied to sheep internally through oral dosage or injection, or applied externally as a pour-on.

Besides pharmaceuticals, disinfectants and sanitizers are also excluded. Only insecticide data were collected and summarized. This survey collected data for insecticides and chemical products that were applied to control external pests.

Insecticide use information on chemical applications made to sheep facilities is also included in this report. For survey purposes, lambing sheds, sun-shades, lean-to's, and feedlots are examples of sheep facilities. Herbicide and termite chemical applications are excluded, as are all rodenticides.



## Highlights

**All Sheep:** Agricultural producers applied 14,191 pounds of insecticides to sheep and lambs during 2000 in the 22 surveyed States.

Fenvalerate, at 5,444 pounds, was the top active ingredient used on sheep with respect to total quantity used, followed by malathion, at 3,940 pounds, and permethrin, at 1,749 pounds. These three active ingredients accounted for 78 percent of the total pounds of active ingredients applied to sheep and lambs in the surveyed States during 2000.

Of the total chemical applications made to sheep in 2000 in the 22 selected States, 46 percent were applied as a pour-on, 25 percent by injection, 11 percent by hand spray, 10 percent by power spray, and 5 percent through oral drench. Insecticide applications made to sheep through mineral or feed block and dust bags each accounted for 1 percent. All other methods accounted for the remaining 1 percent of the chemical applications.

**All Sheep Facilities:** In the 22 surveyed States, a total of 4,984 pounds of insecticides was applied to sheep and lamb facilities in 2000. Petroleum distillate had the highest quantity used at 3,180 pounds. Malathion had the second highest quantity used at 935 pounds, followed by permethrin at 248 pounds. These three active ingredients accounted for 88 percent of the total pounds of active ingredients applied to sheep facilities in the surveyed States during 2000.

**All Sheep and Lambs: Number by Class, State, and United States,  
January 1, 2000-2001**

State	All Sheep and Lambs			Total Breeding		Total Market	
	2000	2001	2001 as % of 2000	2000	2001	2000	2001
	<i>1,000 Head</i>	<i>1,000 Head</i>	<i>percent</i>	<i>1,000 Head</i>	<i>1,000 Head</i>	<i>1,000 Head</i>	<i>1,000 Head</i>
AZ	155.0	132.0	85	66.0	65.0	89.0	67.0
CA	800.0	840.0	105	380.0	375.0	420.0	465.0
CO	440.0	420.0	95	210.0	195.0	230.0	225.0
ID	275.0	275.0	100	245.0	236.0	30.0	39.0
IL	74.0	75.0	101	63.0	61.0	11.0	14.0
IN	59.0	66.0	112	50.0	59.0	9.0	7.0
IA	265.0	270.0	102	170.0	175.0	95.0	95.0
KS	105.0	110.0	105	65.0	71.0	40.0	39.0
MI	68.0	71.0	104	51.0	51.0	17.0	20.0
MN	165.0	170.0	103	105.0	110.0	60.0	60.0
MO	80.0	73.0	91	66.0	59.0	14.0	14.0
MT	370.0	360.0	97	340.0	330.0	30.0	30.0
NE	102.0	114.0	112	88.0	94.0	14.0	20.0
NV	90.0	95.0	106	78.0	83.0	12.0	12.0
N ENG <sup>1</sup>	50.0	50.0	100	45.0	45.0	5.0	5.0
NM	290.0	255.0	88	230.0	200.0	60.0	55.0
NY	58.0	60.0	103	50.0	50.0	8.0	10.0
ND	135.0	138.0	102	103.0	107.0	32.0	31.0
OH	134.0	142.0	106	102.0	110.0	32.0	32.0
OK	55.0	55.0	100	40.0	41.0	15.0	14.0
OR	210.0	245.0	117	151.0	151.0	59.0	94.0
PA	81.0	81.0	100	69.0	69.0	12.0	12.0
SD	420.0	420.0	100	320.0	315.0	100.0	105.0
TX	1,200.0	1,100.0	92	950.0	800.0	250.0	300.0
UT	400.0	390.0	98	360.0	350.0	40.0	40.0
VA	61.0	61.0	100	48.0	46.0	13.0	15.0
WA	50.0	54.0	108	43.0	44.0	7.0	10.0
WV	37.0	35.0	95	31.0	29.0	6.0	6.0
WI	83.0	80.0	96	65.0	66.0	18.0	14.0
WY	570.0	530.0	93	460.0	420.0	110.0	110.0
Other States <sup>2</sup>	150.0	148.0	99	120.0	120.0	30.0	28.0
US	7,032.0	6,915.0	98	5,164.0	4,927.0	1,868.0	1,988.0

<sup>1</sup> N Eng includes CT, ME, MA, NH, RI, and VT.

<sup>2</sup> Other States include AL, AK, AR, DE, FL, GA, HI, KY, LA, MD, MS, NJ, NC, SC, and TN.

**Number of Summarized Reports  
All Sheep: Agricultural Chemical Use,  
Total of States Surveyed, 2000**

	Total of States Surveyed
All Sheep	1,565

**Number of Summarized Reports  
Sheep Facilities: Agricultural Chemical Use,  
Total of States Surveyed, 2000**

	Total of States Surveyed
All Sheep Facilities	224

**All Sheep: Agricultural Chemical Use,  
Total Amount Applied  
Total of States Surveyed, 2000**

	Total of States Surveyed
	<i>Pounds</i>
All Sheep	14,191

**Sheep Facilities: Agricultural Chemical Use,  
Total Amount Applied  
Total of States Surveyed, 2000**

	Total of States Surveyed
	<i>Pounds</i>
All Sheep Facilities	4,984

**All Sheep: Agricultural Chemical Use,  
Total Amount Applied, Total of States Surveyed, 2000**

Agricultural Chemical	Total of States Surveyed
	<i>Pounds</i>
Amitraz	*
Carbaryl	82
Chlorpyrifos	31
Chlorsulon	*
Coumaphos	630
Crotoxyphos	*
Cyfluthrin	1
Cyromazine	*
Diazinon	220
Dichlorvos	62
Dicofol	*
Dimethoate	*
Dioxathion	54
Dipropyl isocinchomeronate	*
Doramectin	8
Eprinomectin	1
Famphur	68
Fenthion	265
Fenvalerate	5,444
Ivermectin	109
Lambda-cyhalothrin	8
Lindane	*
Malathion	3,940
Methoprene	*
Methoxychlor	82
Moxidectin	4
N-octy-bicycloheptene dicarbo.	*
Permethrin	1,749
Petroleum distillate	270
Phosmet	67
Piperonyl butoxide	138
Pyrethrins	6
Ronnel	*
Sulfur	*
Tetrachlorvinphos	297
Toxaphene	*
Trichlorfon	*
Xylene	239

\* Insufficient number of reports to publish data.



**All Sheep: Agricultural Chemical Use,  
Rate per Head per Application, Total of States Surveyed, 2000**

Agricultural Chemical	Total of States Surveyed
	<i>Grams</i>
Amitraz	*
Carbaryl	4.8
Chlorpyrifos	1.1
Chlorsulon	*
Coumaphos	4.0
Crotoxyphos	*
Cyfluthrin	0.04
Cyromazine	*
Diazinon	4.2
Dichlorvos	2.3
Dicofol	*
Dimethoate	*
Dioxathion	2.4
Dipropyl isocinchomeronate	*
Doramectin	0.02
Eprinomectin	0.1
Famphur	5.3
Fenthion	0.9
Fenvalerate	2.3
Ivermectin	0.04
Lambda-cyhalothrin	0.4
Lindane	*
Malathion	11.1
Methoprene	*
Methoxychlor	3.6
Moxidectin	0.1
N-octy-bicycloheptene dicarbo.	*
Permethrin	0.7
Petroleum distillate	4.3
Phosmet	5.8
Piperonyl butoxide	0.3
Pyrethrins	0.6
Ronnel	*
Sulfur	*
Tetrachlorvinphos	3.9
Toxaphene	*
Trichlorfon	*
Xylene	7.3

\* Insufficient number of reports to publish data.

**All Sheep: Agricultural Chemical Use,  
Rate per Head per Year, Total of States Surveyed, 2000**

Agricultural Chemical	Total of States Surveyed
	<i>Grams</i>
Amitraz	*
Carbaryl	7.3
Chlorpyrifos	1.1
Chlorsulon	*
Coumaphos	5.8
Crotoxyphos	*
Cyfluthrin	0.05
Cyromazine	*
Diazinon	4.2
Dichlorvos	2.7
Dicofol	*
Dimethoate	*
Dioxathion	2.4
Dipropyl isocinchomeronate	*
Doramectin	0.02
Eprinomectin	0.1
Famphur	5.3
Fenthion	0.9
Fenvalerate	2.5
Ivermectin	0.1
Lambda-cyhalothrin	0.6
Lindane	*
Malathion	15.5
Methoprene	*
Methoxychlor	10.0
Moxidectin	0.1
N-octy-bicycloheptene	*
Permethrin	0.8
Petroleum distillate	5.4
Phosmet	6.8
Piperonyl butoxide	0.3
Pyrethrins	0.9
Ronnel	*
Sulfur	*
Tetrachlorvinphos	6.3
Toxaphene	*
Trichlorfon	*
Xylene	11.9

\* Insufficient number of reports to publish data.

**All Sheep: Agricultural Chemical Use,  
Percent of Total Applications by Method of Application  
Total of States Surveyed, 2000**

Method	Total of States Surveyed
	<i>Percent</i>
Pour-On	45.6
Injection	25.4
Hand Spray	10.8
Power Spray	9.5
Oral Drench	5.5
Dust Bags	1.5
Feed or Mineral Block	1.0
Other	0.7

**All Sheep Facilities: Agricultural Chemical Use,  
Total Amount Applied, Total of States Surveyed, 2000**

Agricultural Chemical	Total of States Surveyed
	<i>Pounds</i>
Amitraz	*
Butoxypolypropylene glycol	*
Carbaryl	*
Chlorpyrifos	*
Coal Tar Creosote	*
Coumaphos	5
Cyfluthrin	7
Cypermethrin	*
Diazinon	207
Dichlorvos	36
Dimethoate	*
Disulfoton	*
Etridiazole	*
Fenvalerate	13
Hydramethylnon	*
Lambda-cyhalothrin	*
Malathion	935
Methomyl	3
Methoprene	*
N-octy-bicycloheptene dicarbo.	*
Naled	*
Pentachloronitrobenzene	*
Permethrin	248
Petroleum distillate	3,180
Phosmet	*
Piperonyl butoxide	144
Pyrethrins	10
Ronnel	*
Tetrachlorvinphos	*
Tetramethrin	*

\* Insufficient number of reports to publish data.

**Survey Procedures:** The estimates in this report are based on the 2000 National Animal Health Monitoring System (NAHMS) Sheep Survey conducted in January 2001. This survey was based on a sample of pre-screened operators reporting sheep data on a previous NASS survey. Enumerators conducting the survey collected a variety of information including insecticide applications to sheep and sheep facilities for respondents' entire operations. Data were collected in the State where the operation's headquarters was located.

**Estimation Procedures:** The chemical application data, reported by product name or trade name, are reviewed within States and across States for reasonableness and consistency. This review also compares reported data with manufacturers' recommendations and with data from other livestock operators using the same product. Following this level of review, each reported product is then converted to an active ingredient level. This conversion is calculated based on composition and concentration of active ingredients in each product. The chemical usage estimates in this publication consist of survey estimates of those active ingredients.

Data in this report are published at the U.S. level only. Detailed data within a table may not sum to totals due to independent rounding of published values.

**Reliability:** The survey was designed so that the estimates are statistically representative of chemical use on sheep and sheep facilities. The reliability of these survey results is affected by sampling variability and non-sampling errors.

Sampling variability is a measure of how the estimates would differ if other samples had been drawn. The sampling variability expressed as a percent of the estimate is called the coefficient of variation (cv). Sampling variability of the estimates differed considerably by chemical. In general, the more often the chemical was applied, the smaller the sampling variability. For example, estimates of use of a commonly used product, such as ivermectin, will exhibit less variability than a more rarely used product. For more commonly used chemicals, cv's will range from 10-50 percent at the U.S. level. Some rare items could have cv's above 100 percent. These rare items have an insufficient number of reports for publication and are noted with an asterisk (\*).

Non-sampling errors occur during a survey process, but unlike sampling variability, are difficult to measure. They may be caused by interviewers failing to follow instructions, poorly worded questions, non-response, problematic survey procedures, or data handling mistakes between collection and publication. In this survey, all survey procedures and analyses were carried out in a consistent and orderly manner to minimize the occurrence of these types of errors.

## Terms and Definitions

**Active ingredient:** The active ingredient is the specific chemical which kills or controls the target pests. Usage data are reported by pesticide product and are converted to an amount of active ingredient.

**Agricultural chemicals:** The phrase, “agricultural chemicals,” refers to the active ingredients in pesticides.

**Application rates:** The application rates refer to an average weight of a pesticide active ingredient applied to a volume of product. For this survey, rate per application is the average number of grams applied in one application. Rate per year is the average number of grams applied counting multiple applications.

**Carrier:** An inert liquid, solid, or gas added to an active ingredient to make a pesticide dispense effectively. A carrier is also the material, usually water or oil, used to dilute the formulated product for application.

**Common name:** The common name is an officially recognized name for an active ingredient. This report shows active ingredient by common name.

**Diluent:** Any liquid or solid material used to dilute or carry an active ingredient.

**Ear tag:** Metal or plastic device attached to an animal’s ear for identification or to control flies.

**Feed lot:** The confined area where animals are fed. For purposes of this survey, lambs or sheep on feed are defined as those animals being fed a high energy diet for the purpose of reaching acceptable weight to be sold directly to slaughter.

**Lambing shed:** A structure used for lambing.

**Lean-to:** A shelter with a single-pitch roof that is attached to the side of a building as a wing or an extension.

**Pesticides:** As defined by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), pesticides include any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

**Repellent:** A pesticide used to keep target pests away from a treated area by saturating the area with an odor that is disagreeable to the pest.

**Synergist:** A material which exhibits synergism; that is, the joint action of different agents results in an effect greater than the sum of their separate effects.

**Trade name:** A trademark name given to a specific formulation of a pesticide product. A formulation contains a specific concentration of the active ingredient, carrier materials, and other ingredients such as emulsifiers and wetting agents. Some formulations, as in the case of pre-mixes, can contain more than one active ingredient.

## Trade Name, Active Ingredient, and Pesticide Class

The following is a list of the associated class, (I=insecticide) and active ingredients included in this report. Also provided are product trade names associated with the listed active ingredients reported in the survey. This list is provided as an aid in reviewing pesticide data. The list is not complete for all trade names used and NASS does not mean to imply the use of any specific trade name.

Class	:	Active Ingredient	:	Trade Name
I		Amitraz		Tactic, Point-Guard
I		Butoxypolypropylene glycol		Straight Arrow Fly Spray
I		Carbaryl		Sevin
I		Chlorpyrifos		Dursban, Lorsban
I		Clorsulon		Ivomec Plus
I		Coal Tar Creosote		Creosote
I		Coumaphos		Co-Ral, Zip-Cide
I		Crotoxyphos		Purina Lice Powder
I		Cyfluthrin		Countdown, Cylence, Tempo
I		Cypermethrin		Demon
I		Cyromazine		Larvadex
I		Diazinon		Diazinon, Dryzon
I		Dichlorvos		several
I		Dicofol		Dicofol
I		Dimethoate		Cygon
I		Dioxathion		Del-Tox
I		Dipropyl isocinchomeronate		Tox-O-Wik
I		Disulfoton		Terraclor
I		Doramectin		Dectomax
I		Eprinomectin		Eprinex
I		Etridiazole		Terraclor
I		Famphur		Warbex
I		Fenthion		Lysoff, Spotton, Tiguvon
I		Fenvalerate		Ectrin
I		Hydramethylnon		Amdro
I		Ivermectin		Ivomec, Ivercide
I		Lambda-cyhalothrin		Grenade, Saber
I		Lindane		Lindane, Stock Tox,
I		Malathion		Malathion
I		Methomyl		Apache/Die Fly/Stimukil Fly Bait
I		Methoprene		Altosid, MoorMan's IGR
I		Methoxychlor		Marlate, M&M Dust
I		Moxidectin		Cyductin
I		N-octyl bicycloheptene dicarbo.		Purina Fly- A-Rest, Tox-O-Wik

-- continued

Class	Active Ingredient	Trade Name
I	Naled	Fly Killer D
I	Permethrin	several
I	Pentachloronitrobenzene	Terraclor
I	Permethrin	several
I	Petroleum distillate	several
I	Phosmet	Del-Phos, Prolate
I	Piperonyl butoxide	several
I	Pyrethrins	several
I	Ronnel	Golden Marlin Fly Bait
I	Sulfur	Sulfur Stock Block
I	Tetrachlorvinphos	Rabon
I	Tetramethrin	Raid
I	Toxaphene	Stock Tox
I	Trichlorfon	Neguvon
I	Xylene	Stock Tox, Warbex



**SECTION J:**

**CHEMICAL APPLICATIONS TO SHEEP AND LAMBS**

[If SECTION I, Item 8 equals YES, continue; otherwise, enter a "3" in Item Code 711, then SKIP to SECTION K]

Now I need to get complete information on **insecticides** and **chemicals** applied to Sheep and Lamb on this operation in 2000. (Exclude fungicides and pharmaceuticals not used to treat external pests.)

	<b>000</b>
1 - Incomplete 3 - Valid Zero	711
LINES IN TABLE	712

**[ENUMERATOR NOTE:** Complete tables for all chemical applications to **Sheep and Lambs**. Use supplemental tables if necessary. If no code is listed in the Respondent Booklet, record the name and formulation of the insecticide product applied, what it was used for, whether it was liquid or dry, and its NADA/EPA registration number.]

NOTES	L I N E	1		2		3	
		Product	Code	Code	Code	What was the method of application?	
		What product(s) were applied to your sheep or lambs?  (Show product codes from Respondent Booklet)		Formulation  Was this product bought in liquid or dry form?  L = Liquid D = Dry		1 Hand spray 2 Power spray 3 Injection 4 Feed Additive 5 Pour-on 6 Dust Bags/Dry Rub 7 Ear Tags 8 Dip 9 Feed/Mineral Block 10 Rubbing Device 11 Pill 14 Drench 12 Other	
	101		701				702
	102		701				702
	103		701				702
	104		701				702
	105		701				702
	106		701				702
	107		701				702
	108		701				702

**FOR USE ONLY IF THE PRODUCT USED IS NOT LISTED IN THE RESPONDENT BOOKLET OF CHEMICALS**

LINE	(Insecticide)	NADA/EPA No. or Trade Name and Formulation	Form Purchased (Liquid or Dry)	Where Purchased [Ask only if NADA/EPA No. cannot be reported.]
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

L I N E	4	5	OR	6	7	8
	How many head were treated with this product?	How much was applied per HEAD per application?		What was the TOTAL amount applied per application?	1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams 31 cc/ml 35 Tags 37 Pills 41 Liters 50 Other	How many times was this applied?
	Number				Unit Code	Number
101	703	704		705	706	707
102	703	704		705	706	707
103	703	704		705	706	707
104	703	704		705	706	707
105	703	704		705	706	707
106	703	704		705	706	707
107	703	704		705	706	707
108	703	704		705	706	707

**SECTION K:**

**CHEMICAL APPLICATIONS TO SHEEP and LAMB FACILITIES**

1. In 2000, on your total acres operated, did you apply any **insecticides** or other **chemical products** to sheep and lamb facilities to control insects? Include buildings that are used by sheep and lambs on this operation, such as lambing sheds, lean-to's, sun-shades, feedlots, etc.

**YES**  - (Continue)  
**NO**  - (Enter 3 in Code Box 713, and go to Section L)

2. Now I need to get complete information on **insecticides** (exclude herbicides and fungicides) and **chemicals** applied to Sheep and Lamb facilities on this operation in 2000.

	<b>000</b>
1 - Incomplete 3 - Valid Zero	713
LINES IN TABLE	714

**[ENUMERATOR NOTE: Complete tables for all insecticide applications to Sheep and Lamb facilities. Sheep and Lamb facilities include buildings, structures, etc. Use supplemental tables if necessary. If no code is listed in the Respondent Booklet, record the name and formulation of the product applied, what it was used for (insecticide, other), whether it was liquid or dry, and its EPA/NADA registration number.]**

NOTES	L I N E	1		2		3
		Facility Treated		What product(s) were applied to the [column 1] facility?  [Show product codes from Respondent Booklet]		Was this product bought in liquid or dry form?  L = Liquid D = Dry
		Facility	Code	Product	Code	Code
	201		709		701	
	202		709		701	
	203		709		701	
	204		709		701	
	205		709		701	
	206		709		701	
	207		709		701	
	208		709		701	
	209		709		701	

LINE	Pesticide Type (Insecticide)	NADA/ EPA No. or Tradename and Formulation	Form Purchased (Liquid or Dry)	Where Purchased [Ask only if NADA/EPA No. cannot be reported.]
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

L I N E	4	5	6
	What was the TOTAL amount applied per application?	1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams 31 cc/ml 41 Liters 50 Other  Unit Code	How many times was this applied?  Number
201	705 ▪ _ _ _	706	707
202	705 ▪ _ _ _	706	707
203	705 ▪ _ _ _	706	707
204	705 ▪ _ _ _	706	707
205	705 ▪ _ _ _	706	707
206	705 ▪ _ _ _	706	707
207	705 ▪ _ _ _	706	707
208	705 ▪ _ _ _	706	707
209	705 ▪ _ _ _	706	707

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## Report Features

Released May 23, 2001, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, U.S. Department of Agriculture. For information on "Agricultural Chemical Usage" call (202) 720-6146, office hours 7:30 a.m. to 4:00 p.m. ET.

Listed below are persons within the National Agricultural Statistics Service to contact for additional information.

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