

# Formulation Example

## Insect Repellent Spray with IR3535® (EUS26-15)

| Ingredients                  | INCI                             | [%]   | CAS No.               | EPA Inert List           |
|------------------------------|----------------------------------|-------|-----------------------|--------------------------|
| <b>Phase A</b>               |                                  |       |                       |                          |
| <b>IR3535®</b>               | Ethyl Butylacetylaminopropionate | 20.00 | 52304-36-6            | <b>Active Ingredient</b> |
| Carbowax 400 /Union Carbide  | Polyethylene glycol 400          | 5.00  | 25322-68-3            | 4B                       |
| Arlamol E                    | PEG-15 Stearyl Ether             | 1.00  | 25231-21-4            | 4B                       |
| <b>Phase B</b>               |                                  |       |                       |                          |
| Ethanol SD 40B               | Denatured Alcohol                | 35.00 | 61116-08-3            | 4B                       |
| Carbowax 1450 /Union Carbide | Polyethylene glycol 1500         | 4.00  | 25322-68-3            | 4B                       |
| PVP/VA Copolymer E-735 /ISP  | PVP/VA copolymer                 | 2.00  | 25086-89-9<br>64-17-5 |                          |
| Polysorbate 20 / Uniquema    | Tween 20                         | 1.50  | 9005-64-5             | 4B                       |
| Water, demineralized         | Aqua (Water)                     | 31.50 | 7732-18-5             | 4A                       |

### Procedure:

1. In a main kettle combine ingredients of phase B, in the listed order. Mix well between each addition. A clear solution should be obtained.
2. In auxiliary kettle, combine ingredients of phase B one at a time, stirring well after each addition until clear.
3. Slowly add phase A to B with continuing stirring.
4. Mix batch for 15-20 min until uniform. Send sample to QC lab for evaluation.

***Note: the full procedure is performed at room temperature***

### Notes:

pH (21°C): 6.7

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# Formulation Example

## Insect Repellent Aerosol with IR3535® (EUS26-16)

| Ingredients                      | INCI                             | [%]   | CAS No.               | EPA<br>Inert List        |
|----------------------------------|----------------------------------|-------|-----------------------|--------------------------|
| <b>Phase A</b>                   |                                  |       |                       |                          |
| <b>IR3535®</b>                   | Ethyl Butylacetylaminopropionate | 20.00 | 52304-36-6            | <b>Active Ingredient</b> |
| <b>Phase B</b>                   |                                  |       |                       |                          |
| Ethanol SD 40B                   | Denatured Alcohol                | 21.67 | 61116-08-3            | 4B                       |
| Propylene glycol / Union carbide | Propylene glycol                 | 4.34  | 57-55-6               | 4 B                      |
| PVP/VA Copolymer E-735 /ISP      | PVP/VA copolymer                 | 1.73  | 25086-89-9<br>64-17-5 |                          |
| Water, demineralized             | Aqua (Water)                     | 17.26 | 7732-18-5             | 4A                       |
| <b>Phase C</b>                   |                                  |       |                       |                          |
| A31, Isobutane /Aeropres         | Isobutane                        | 35.00 | 75-28-5               |                          |

Valve code V-71

### **Procedure:**

1. In a main kettle, combine ingredients of phase B in the listed order. Mix well between each addition.
2. Add Phase A to B, mixing until uniform 15-20 min. A clear solution should be obtained.
3. Send a sample to QC lab for evaluation.
4. Fill into containers and pressurize with phase C (propellant).

***Note: the full procedure is performed at room temperature.***

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# Formulation Example

## Insect Repellent Lotion with IR3535® (WV29-01)

| Ingredient                            | INCI   | (%)    |
|---------------------------------------|--|--------|
| <b>PHASE A</b>                        |  |        |
| Water, demineralized                  | AQUA (WATER)   | ad 100 |
| 1,3-Butanediol (Merck KGaA)           | BUTYLENE GLYCOL  | 4.00   |
| Titriplex® III (Merck KGaA)           | DISODIUM EDTA  | 0.10   |
| <b>PHASE B1</b>                       |  |        |
| Rhodicare-S (Rhodia GmbH)             | XANTHAN GUM  | 0.20   |
| Carbopol ETD 2050 (Noveon)            | CARBOMER   | 0.30   |
| <b>PHASE B2</b>                       |  |        |
| Triethanolamine (Merck KGaA)          | TRIETHANOLAMINE  | 0.20   |
| <b>PHASE C</b>                        |  |        |
| Arlacel 165 VP (Uniquema)             | GLYCERYL STEARATE, PEG-100 STEARATE                            | 3.50   |
| Dow Corning 200 (100cs) (Dow Corning) | DIMETHICONE  | 0.50   |
| Isopropyl palmitate (Cognis)          | ISOPROPYL PALMITATE  | 4.00   |
| Lanette 16 (Cognis)                   | CETYL ALCOHOL  | 1.00   |
| Crodamol STS (Croda)                  | PPG-3 BENZYL ETHER MYRISTATE                                   | 2.00   |
| R3535®                                | ETHYL BUTYLACETYLAMINOPROPIONATE                               | 10.00  |
| Stearic acid (Merck KGaA)             | STEARIC ACID   | 2.00   |
| <b>PHASE D</b>                        |  |        |
| Seibel 305 (Seppic)                   | LAURETH-7, POLYACRYLAMIDE, C13-14 ISOPARAFFIN                  | 1.00   |
| <b>PHASE E</b>                        |  |        |
| Triethanolamine (Merck KGaA)          | TRIETHANOLAMINE  | 0.10   |
| <b>PHASE F</b>                        |  |        |
| Paragon II/McIntyre                   | PROPYLENE GLYCOL, DMDM HYDANTOIN, METHYLPARABEN, PROPYLPARABEN | 1.00   |

### Procedure:

1. Meter phase A into main mixing kettle. Slowly sprinkle B1 into A with rapid propeller agitation. Mix until clear and free of lumps; begin heating to 75°C.
2. Pre-neutralize Carbomer by adding phase B2 to A/B1.
3. In auxiliary kettle, combine ingredients of phase C under Lightnin' mixing and heat to 80°C.

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# Formulation Example

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Maintain mixing until all solids are fully melted and batch appears translucent.

4. Slowly add phase C to A/B under a high shear until emulsification is complete.
5. Add phase D; homogenize batch (~2500 rpm) for 10 min.; a smooth and uniform texture should be obtained.
6. Switch to Lightnin' mixing and start to cool batch.
7. When temperature reaches 50°C adjust pH (6-6.5) by adding phase E. Check pH with QC lab.
8. At 40°C add phase F under moderate sweep, to ensure even dispersion.
9. Mix until uniform, drop batch at 30°C. Send sample to QC lab for evaluation.

**Notes:**

pH value (24°C): 6.60

Viscosity: TBD (Brookfield DV-II+, spindle B, 20 rpm, Helipath) at 30 C

Appearance: white lotion

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