When incorporated into sunscreen products they tint the formula reducing the appearance of whitening and chalkiness, while also contributing to UV Attenuation. In Ethnic Products, Transparent Iron Oxides offer the right balance of transparency and coverage that allows a natural look. Transparent Iron Oxides are much smaller than regular iron oxides, and therefore the particles tend to agglomerate very strongly, making them difficult to disperse. Kobo offers dispersions as well as surface treated powders of Transparent Iron Oxides that can easily be incorporated into a formulation.

WO 2008067186, JP pending
UV protective cosmetic product incorporating titanium dioxide and transparent iron oxide

KSL-452
W/O All-in-One Protective Sunscreen Cream

Part 1
- NHP60MZ8SG - Kobo Products: Zinc Oxide (And) C13-15 Alkane (And) Stearoyl Glutamic Acid (And) Polyhydroxystearic Acid 20.00%
- NHP55STS - Kobo Products: Titanium Dioxide (And) C13-15 Alkane (And) Searic Acid (And) Aluminum Hydroxide (And) Polyhydroxystearic Acid 10.00%
- TNP45TEL - Kobo Products: Titanium Dioxide (And) C12-15 Alkyl Benzoate (And) Searic Acid (And) Silica (And) Alumina (And) Polyhydroxystearic Acid 9.40%
- KSG-210 - Shin-Etsu: Dimethicone (and) Dimethicone/PEG-10/15 Crosspolymer 5.00%
- A1K-TiO2-11S2 - Kobo Products: Titanium Dioxide (And) Aluminum Hydroxide (And) Triethoxycaprylylsilane 3.20%
- X-22-6695B - Shin-Etsu: Simmondsia Chinensis (Jojoba) Seed Oil (and) Lauryl Dimethicone/Polyglycerin-3 Crosspolymer 2.50%

Part 2
- Bentone® 38 V CG - Elementis: Distearidimonium Hectorite 1.00%

Part 3
- COSMOL™ 43V - Ikeda: Polyglyceryl-2 Triisostearate 1.50%

Part 4
- Deionized Water - Water 40.35%
- Butylene Glycol - Pride Solvents & Chemicals Co. of NJ, Inc.: Butylene Glycol 3.00%
- Sodium Chloride - Morton Salt: Sodium Chloride 2.90%
- Euxyl® PE 9010 - Schulke & Mayr: Phenoxethanol (And) Ethylhexyglycerin 1.00%
- Edeta® BD - BASF: Disodium EDTA 0.05%

Manufacturing Procedure
2.  Continue mixing until uniform thickening is formed.
3. Add Part 2 to batch. Continue mixing for 5 min.
4. Add Part 3 to batch. Continue mixing until additional thickening is formed.
6. Add Part 4 to batch for slow absorption with pipette.

Note:
High shearing must be applied before and after emulsion. Keep cool in cold water bath during high shear process

Description
This non-greasy, quick drying sunscreen gives a sheer, matte finish. It offers broad-spectrum protection against UVA, UVB and IR rays. The W/O formula features Kobo’s NHP and TNP45TEL dispersions for UVA/UVB and TNP45TEL, a granular TiO2 powder treated with Triethoxycaprylylsilane, effectively blocks IR radiation in the near infrared range. Transparent Iron Oxide dispersion, GCG50TRSG, provides a light tint.

Note:
High shearing must be applied before and after emulsion. Keep cool in cold water bath during high shear process

Active Ingredients
Titanium Dioxide 8.24%
Zinc Oxide 11.40%

Testing
SPF: In vivo on 5 subjects
CW: FDA Method
<table>
<thead>
<tr>
<th>Carrier/Solvent</th>
<th>Product Name</th>
<th>INCI Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Silicone Emulsifiers</strong></td>
<td>FAF40TRR</td>
<td>Cyclopentasiloxane (And) Iron Oxides (CI 77491) (And) Lauryl PEG-9 Polydimethylsiloxynyl Dimethicone (And) Hydrogen Dimethicone (And) PEG/PPG-18/18 Dimethicone</td>
</tr>
<tr>
<td></td>
<td>FAF40TRY</td>
<td>Cyclopentasiloxane (And) Iron Oxides (CI 77492) (And) Lauryl PEG-9 Polydimethylsiloxynyl Dimethicone (And) Hydrogen Dimethicone (And) PEG/PPG-18/18 Dimethicone</td>
</tr>
<tr>
<td><strong>Esters/Oils</strong></td>
<td>TNP55TRR</td>
<td>Iron Oxides (CI 77491) (And) C12-15 Alkyl Benzoate (And) Triethoxycaprylylsilane (And) Polyhydroxystearic Acid</td>
</tr>
<tr>
<td></td>
<td>TNP55TRY</td>
<td>Iron Oxides (CI 77492) (And) C12-15 Alkyl Benzoate (And) Triethoxycaprylylsilane (And) Polyhydroxystearic Acid</td>
</tr>
<tr>
<td><strong>Natural Esters/Oils</strong></td>
<td>COP40TRR</td>
<td>Ricinus Communis (Castor) Seed Oil (And) Iron Oxides (CI 77491) (And) Polyhydroxystearic Acid (And) Isopropyl Titanium Trisostearate</td>
</tr>
<tr>
<td></td>
<td>COP40TRY</td>
<td>Ricinus Communis (Castor) Seed Oil (And) Iron Oxides (CI 77492) (And) Polyhydroxystearic Acid (And) Isopropyl Titanium Trisostearate</td>
</tr>
<tr>
<td></td>
<td>GCG50TRSG</td>
<td>Iron Oxides (CI 77491) (And) Caprylic/Capric Triglyceride (And) Polyglyceryl-3 Disostearate (And) Stearoyl Glutamic Acid</td>
</tr>
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<td></td>
<td>GCG50TYSG</td>
<td>Iron Oxides (CI 77492) (And) Caprylic/Capric Triglyceride (And) Polyglyceryl-3 Disostearate (And) Stearoyl Glutamic Acid</td>
</tr>
<tr>
<td><strong>Volatile Non-D5 Silicones</strong></td>
<td>DIM2F50TRR</td>
<td>Dimethicone (And) Iron Oxides (CI 77491) (And) PEG-9 Polydimethylsiloxynyl Dimethicone (And) Hydrogen Dimethicone (And) Polyglyceryl-4 Isostearate (And) Cetyl PEG/PPG-10/1 Dimethicone (And) Hexyl Laurate</td>
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<tr>
<td></td>
<td>DIM2F45TRY</td>
<td>Dimethicone (And) Iron Oxides (CI 77492) (And) PEG-9 Polydimethylsiloxynyl Dimethicone (And) Hydrogen Dimethicone (And) Polyglyceryl-4 Isostearate (And) Cetyl PEG/PPG-10/1 Dimethicone (And) Hexyl Laurate</td>
</tr>
<tr>
<td><strong>Hydrophobic</strong></td>
<td>TRR-100-MS7</td>
<td>Iron Oxides (CI 77491) (And) Methicone</td>
</tr>
<tr>
<td></td>
<td>TRY-100-MS7</td>
<td>Iron Oxides (CI 77492) (And) Methicone</td>
</tr>
<tr>
<td><strong>Hydrophilic</strong></td>
<td>TRR-100-SW2</td>
<td>Iron Oxides (CI 77491) (And) PEG-8 Methyl Ether Triethoxysilane</td>
</tr>
<tr>
<td></td>
<td>TRY-100-SW2</td>
<td>Iron Oxides (CI 77492) (And) PEG-8 Methyl Ether Triethoxysilane</td>
</tr>
</tbody>
</table>

*Please note, Transparent Iron Oxides are extremely difficult to disperse. Kobo dispersions containing these powders are highly recommended when possible. This will ensure fully dispersed particles in the final formula.*

Transmittance curves of Transparent Yellow Iron Oxide and Transparent Red Iron Oxide compared to Pigmentary Yellow Iron Oxide and Pigmentary Red Iron Oxide