



Europäisches  
Patentamt  
European  
Patent Office  
Office européen  
des brevets

## Combination Sets

Fields of Compositions, Coatings and Adhesives  
C08L, C09D, C09J



# Content

- **Scope**
- **The CPC scheme**
  - **Hierarchy in CPC, main subdivisions of C08L**
  - **Overview of Main groups in C08L**
- **Rules for classification**
  - **Finding the correct sub-group**
  - **Building the Combination Set**
- **Classification in practice**
- **Neighbouring fields**
- **C09D and C09J: Coatings and adhesives based on non-macromolecular compounds**
  - **C09D4, C09J4**
  - **C08L33, C09D133, C09J133**
- **Tips for search**
- **Examples of classification**

## The CPC scheme: Hierarchy in CPC :

- Section                    C                    → **Chemistry**
- Class                    C08                    → **Polymers**
- Subclass                C08L                    → **Compositions of  
Macromolecular  
compounds**

Guidance Heading

**Compositions**

- Main Group, e.g.    **C08L31/00**                    → Copolymers of  
vinyl ester compounds
- Subgroups (after /) . C08L31/02  
                                   .. C08L31/04  
                                   → Homopolymers or copolymers of vinyl acetate
- For example: A composition wherein a copolymer of vinyl acetate in majority will receive a **C08L31/04**

## Hierarchy in CPC (2) :

<b>C08L 31/00</b>	<b>Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid or of a haloformic acid ( of hydrolysed polymers <a href="#">C08L 29/00</a> ) ; Compositions of derivatives of such polymers</b>
<a href="#">C08L 31/02</a>	. Homopolymers or copolymers of esters of monocarboxylic acids
<a href="#">C08L 31/04</a>	.. Homopolymers or copolymers of vinyl acetate
<a href="#">C08L 31/06</a>	. Homopolymers or copolymers of esters of polycarboxylic acids
<a href="#">C08L 31/08</a>	.. of phthalic acid

- Main Group, e.g. **C08L31/00** → Copolymers of vinyl ester compounds
- Subgroups (after /) . **C08L31/02**  
                                   .. **C08L31/04**  
                                   → Homopolymers or copolymers of vinyl acetate
- For example: A composition wherein a copolymer of vinyl acetate in majority will receive a **C08L31/04**

# The CPC scheme: Overview of Main Groups in C08L:

Classes for composition	Type of polymer present in majority in the composition	Classes corresponding to the polymer per se
C08L1/00	Cellulose and derivatives	C08B1/00-17/06
C08L3/00	Starch, amylose, amylopectin and derivatives	C08B30/00-35/08
C08L5/00	Other polysaccharides	C08B37/00-37/00P6F
C08L7/00	Natural rubber	
C08L9/00	polydiene rubber (conjugated diene hydrocarbons)	C08F36/00
C08L11/00	Chloroprene rubber	C08F36/16
C08L13/00	"Acrylic rubber" (rubbers containing carboxylic groups)	C08F20/00
C08L15/00	Rubber derivatives	C08C
C08L17/00	Reclaimed rubber	
C08L19/00	Other specified rubbers	
C08L21/00	Unspecified rubber	
C08L23/00	Polyolefins (23/06: PE, 23/12: PP)	C08F10/00-14
C08L25/00	Polystyrenes (25/06)	C08F12/00
C08L27/00	Halogenated polymers, PVC (27/06), Teflon	C08F14/00
C08L29/00	Polyvinylalcohol (PVOH: 29/04)	C08F16/00
C08L31/00	Polyvinylacetate (PVA: 31/04)	C08F18/00
C08L33/00	"(Meth)acrylics", nitriles	C08F20/00
C08L35/00	"Dicarboxylic acids" (maleic)	C08F22/00
C08L37/00	O cont. heterocyclic vinyl polymers	C08F24/00
C08L39/00	N cont. vinyl polymers (PVP, PVamine)	C08F26/00
C08L41/00	S cont. vinyl polymers	C08F28/00
C08L43/00	P, Si cont vinyl polymers	C08F30/00
C08L45/00	Cyclic C=C polymers	C08F32/00
	Coumarone indene	C08F244/00
C08L47/00	Diene/polyene polymers	C08F36/00
C08L49/00	Poly(acetylene)	C08F38/00
C08L51/00	Graft polymers	C08F251/00-292/00

C08L53/00	Block polymers	C08F293/00-299/00
C08L55/00	Other C=C polymers 55/02: ABS	C08F301/00
C08L57/00	Mineral oil hydrocarbons	C08F240/00
C08L59/00	Polyacetals (POM)	
C08L61/00	Condensation aldehydes and ketones (phenol-formaldehyde resins)	C08G2/00-16/00
C08L63/00	Epoxy resins (novolacs)	C08G59/00
C08L65/00	Polyaromatics, polyphenylenes	C08G61/00
C08L67/00	Polyesters	C08G63/00
C08L69/00	Polycarbonates	C08G64/00
C08L69/00B	Polyether-carbonates	C08G63/00 or 64/00
C08L71/00	Polyethers (PEG/PEO)	C08G65/00
C08L73/00	Polyanhydrides	C08G67/00
C08L75/00	Polyurea/polyurethanes	C08G18/00
C08L77/00	Polyamides	C08G69/00
C08L79/00	Polyamines, imides, hydrazides	C08G73/00
C08L81/00	Polythioethers, sulfides, sulfones, sulfonamides	C08G75/00
C08L83/00	Polysilicates, polysiloxanes	C08G77/00
C08L85/00	P,B containing polymers	C08G79/00
C08L87/00	Unspecific non C=C polymers	C08G83/00
C08L89/00	Proteins and derivatives	C08H1/00-1/06, C09H
C08L91/00	Oils, fats and waxes	C08F242/00, C08H3/00, C09G3/00
C08L93/00	Natural resins	C09F
C08L95/00	Bitumen	
C08L97/00	Lignin (L97/00C), Lignocellulosic material / "wood" (L97/02)	C08H6/00 (lignin), C08H8/00 (lignocellulosic material)
C08L99/00	Other natural macromolecules (flours, kernels)	C08H99/00
C08L101/00	Unspecified polymers (e.g. dendritic), only minority polymer defined	C08F246/00, C08G83/00

Compositions based on chemical structure of the polymers present therein

## Overview of Main Groups in C08L(2): Further Guidance headings for sub-groups specifying additional features

- ❖ C08L2201/00-C08L2203/40: (properties and applications)  
use and properties of the compositions (not be included in the Combination Set)
- ❖ C08L2205/00: polymer mixtures  
use and properties of the compositions (not be included in the Combination Set)
- ❖ C08L2207/00: compositions of polyolefins
- ❖ C08L2308/00: chemical blending
- ❖ C08L2310/00: masterbatch (see also C08J3/226)
- ❖ C08L2312/00: cross linking (see also C08J3/24)
- ❖ C08L2314/00: by way of preparation (for polyolefins)
- ❖ C08L2555/00: bituminous mixtures (for asphalt polymer)

# Rules for Classification:

## 1) Finding the correct C08L sub-group

For each polymer of the composition:

1. Select the main group on the basis of the polymer structure:

- Polyolefins: C08L23
- Polyacrylates: C08L33
- Polyesters: C08L67

2. For copolymers:

- The monomer in **majority** determines the main group.
- Select the most appropriate sub-group on the basis of the comonomer(s) present, last place rule applies,
- For polymers with a special functional group, see below

## Finding the correct C08L sub-group (2)

- Copolymer of **ethylene**, **acrylic ester** and **vinyl acetate**
  - with **ethylene** in majority: C08L**23/0869** instead of C08L**23/0853**

C08L 23/00	<b>Compositions of homopolymers or copolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond ; Compositions of derivatives of such polymers</b>
C08L 23/02	. not modified by chemical after-treatment
C08L 23/025	.. { Copolymer of an unspecified olefin with a monomer other than an olefin }
C08L 23/04	.. Homopolymers or copolymers of ethene
C08L 23/06	... Polyethene
C08L 23/08	... Copolymers of ethene ( <a href="#">C08L 23/16</a> takes precedence )
C08L 23/0807	.... { Copolymers of ethene with unsaturated hydrocarbons only containing more than three carbon atoms }
C08L 23/0815	..... { Copolymers of ethene with aliphatic 1-olefins }
C08L 23/0823	..... { Copolymers of ethene with aliphatic cyclic olefins }
C08L 23/083	..... { Copolymers of ethene with aliphatic polyenes, i.e. containing more than one unsaturated bond }
C08L 23/0838	..... { Copolymers of ethene with aromatic monomers }
C08L 23/0846	.... { Copolymers of ethene with unsaturated hydrocarbons containing other atoms than carbon or hydrogen atoms }
C08L 23/0853	..... { Vinylacetate }
C08L 23/0861	..... { Saponified vinylacetate }
C08L 23/0869	..... { Acids or derivatives thereof }
C08L 23/0876	..... { Neutralised polymers, i.e. ionomers }
C08L 23/0884	..... { Epoxide containing esters }
C08L 23/0892	..... { containing monomers with other atoms than carbon, hydrogen or nitrogen atoms }

## Finding the correct C08L sub-group (3)

- Copolymer of **ethylene**, **acrylic ester** and **vinyl acetate**
  - With **acrylic ester** in majority: C08L33/08

C08L 33/02	. Homopolymers or copolymers of acids ; Metal or ammonium salts thereof
C08L 33/04	. Homopolymers or copolymers of esters { ( <a href="#">C08L 43/04</a> takes precedence ) }
C08L 33/06	.. of esters containing only carbon, hydrogen and oxygen, which oxygen atoms are present only as part of the carboxyl radical
C08L 33/062	... { Copolymers with monomers not covered by <a href="#">C08L 33/06</a> }
C08L 33/064	.... { containing anhydride, COOH or COOM groups, with M being metal or onium-cation }
C08L 33/066	.... { containing -OH groups }
C08L 33/068	.... { containing glycidyl groups }
C08L 33/08	... Homopolymers or copolymers of acrylic acid esters
C08L 33/10	... Homopolymers or copolymers of methacrylic acid esters
C08L 33/12	.... Homopolymers or copolymers of methyl methacrylate
C08L 33/14	.. of esters containing halogen, nitrogen, sulfur, or oxygen atoms in addition to the carboxy oxygen
C08L 33/16	... Homopolymers or copolymers of esters containing halogen atoms

## Finding the correct C08L sub-group (4)

- Copolymer of **ethylene**, **acrylic ester** and **vinyl acetate**
  - With **vinyl acetate** in majority: C08L31/04

**C08L 31/00**      **Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid or of a haloformic acid ( of hydrolysed polymers [C08L 29/00](#) ) ; Compositions of derivatives of such polymers**

C08L 31/02      . Homopolymers or copolymers of esters of monocarboxylic acids

C08L 31/04      .. Homopolymers or copolymers of vinyl acetate

C08L 31/06      . Homopolymers or copolymers of esters of polycarboxylic acids

C08L 31/08      .. of phthalic acid

## Finding the correct C08L sub-group (5)

- Copolymer of ethylene, acrylic ester and vinyl acetate
  - If all monomers in equal amounts then all three sub-groups are given
    - C08L23/0869
    - C08L33/08
    - C08L31/04

## Rules for Classification: Building the Combination Set

- In a composition containing **two** polymers, the **base** symbol is the polymer in **majority**.
- The nature of the second component is added at the second place in the Combination Set:  
(Symbol of the polymer in majority, Symbol for further polymer(s))
- Ex: A blend of 60 parts **polyethylene** and 40 parts **polyamide** is classified in

Combination Set: C08L**23/06**, C08L**77/00**

- If polymers are disclosed in equal amounts two Combination Sets based on each polymer is given
- Ex: A blend of 50 parts **polyethylene** and 50 parts **polyamide** is classified in

Combination Set: C08L**23/06**, C08L**77/00**

Combination Set: C08L**77/00**, C08L**23/06**

## Building the Combination Set (2)

- In a composition comprising **three** or **more** copolymers, the nature of further polymers are added in the Combination Set and the appropriate indexing code **C08L2205/02** or **/03** is given
- A composition containing a **polyamide** in majority, a **polyester** and a **polyethylene** is classified in  
Combination Set: C08L**77/00**, C08L**67/00**, C08L**23/06**  
Single Symbol Additional: **C08L2205/03**
- Compositions containing two polymers of the **same .dot** group, for example compositions of two ionomers, are characterised by the Indexing Code **C08L2205/025**.
- The complete classification for a compositions of a **K+ and a Na+ ionomer** therefore would be  
Combination Set: C08L**23/0876**, C08L**23/0876**  
Single Symbol Additional: **C08L2205/025**.
- The same applies for compositions of two polymers only distinguished by physical properties (i.e. molecular weight, density etc, see **C08L2xxx**).

## Classification in practice:

- ❖ We give Combination Sets only when the compositions are explicitly disclosed in the document, either in the general description or in the examples (not for hypothetic compositions or lists of possible compositions that may be used), seldom from claims.
- ❖ Relative amounts are as expressed in the document (weight or molar)
- ❖ We classify all examples
- ❖ In the documents containing too many examples, classify the most relevant one(s), relevant polymers should be classified at least once.
- ❖ If the polymers in the compositions are disclosed by generic or trade names, use the appropriate main group (/00)

## Most important neighbouring fields

- Presence of organic or inorganic additives with a single polymer: (C08K5/xx,C08L/xx)
  
- Applications or Uses:
  - Adhesives C09J1XX (XX: same numbers as C08L)
  - Coatings C09D1XX (XX: same numbers as C08L)
  - Foams, C08J...
  - These classes are given when the specific **use** of the polymer is disclosed in the document, the corresponding classes for the monomers (C08F216-222) are also given as additional information **when** the polymerisation is disclosed.
- C09D4/00, C09J4/00 (and /06): coatings or adhesives based on organic non-macromolecular compounds, see below.

# Coatings and Adhesives

- Main group C08L concerns **compositions** of polymers with an other polymer
- Main group C09D concerns **coating** compositions characterised by one or more polymers
- Main group C09J concerns **adhesive** compositions characterised by one or more polymers

## CPC Schemes for Coatings and Adhesives (2)

- **C09D Coating compositions**

- ❖ C09D1-D17: General aspects

- ❖ C09D101-C09D201; Coatings characterized by the polymer used

- **C09J Adhesives**

- ❖ C09J1-C09J11: General adhesive

- ❖ C09J101-C09J201: Adhesives characterized by the polymer used

In C09D1XX and C09J1XX, the XX corresponds to the C08LXX main group



see C08L classification

## C08L/C09D/C09J Classification guidelines

- **Coating** or **adhesive** compositions characterised by **one** polymer: only one symbol is given **C09D1XX** or **C09J1XX**
- **Coating** or **adhesive** compositions characterised by **two** or more polymers: **Combination Set** is also given
  - Combination Set: **C09D1XX**, C08LYY
  - Combination Set: **C09J1XX**, C08LYY
- Same rules apply as in C08L, base symbol is the polymer in majority, further symbol(s) represent the further polymer(s)
- If more than two polymers are present: C08L2205/02 or /03 added as separate indexing code

## C08L/C09D/C09J Examples

- A coating composition containing 80 parts of **polyethylene** and 20 parts of **polyvinylchloride** is classified in  
Combination Set: C09D1**23/06**, C08L**27/06**
- A coating composition containing 50 parts of **polyethylene** and 50 parts of **polyvinylchloride** is classified in
  - Combination Set C09D1**23/06**, C08L**27/06**  
and
  - Combination Set: C09D1**27/06**, C08L**23/06**).
- An adhesive containing 80 parts of **polyethylene** and 20 parts of **polyvinylchloride** is classified in  
Combination Set C09J1**23/06** , C08L**27/06** ).
- An adhesive containing 50 parts of **polyethylene** and 50 parts of polyvinylchloride is classified in
  - Combination Set C09J1**23/06** , C08L**27/06**  
and
  - Combination Set C09J **127/06** ,C08L**23/06**

## C09D4, C09J4: Coatings and adhesives based on non-macromolecular compounds

- C09D4/00, C09J4/00: Coatings or adhesives based on organic non-macromolecular compounds having at least one unsaturated bond.
- Polymerisation directly provides the coating or adhesive.
- No preformed polymer as in C09D1xx, C09J1xx
- Combination Set is given to specify the monomer in majority that is used in the coating or adhesive.
- For example a coating based on **methyl methacrylate**:  
Combination Set: C09D4/00, C08F220/14
- If a mixture of monomers is used and a copolymer is formed, a Combination Set as in C08F is given:
- For example a coating based on **methyl methacrylate**, **hydroxalkylmetacrylate** and **methacrylic acid**:  
Combination Set: C09D4/00, C08F220/14  
Combination Set: C08F220/14, C08F220/20, C08F220/06

## C09D4, C09J4: Coatings and adhesives based on non-macromolecular compounds

- C09D4/06, C09J4/06: Coatings or adhesives based on organic non-macromolecular compounds having at least one unsaturated bond in combination with a macromolecular compound
- The resulting polymer may be considered as a graft C08F251/00 to C08F291/00.
- A Combination Set is given to specify the kind of polymer formed:
- For example a coating based on methyl methacrylate, and polymethylmethacrylate:

Combination Set: C09D4/06, C08F265/06

Combination Set: C08F265/06, C08F220/14

## C08L33, C09D133, C09J133

- **C08L 33/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and only one being terminated by only one carboxyl radical, or of salts, anhydrides, esters, amides, imides or nitriles thereof ; Compositions of derivatives of such polymers**
- C08L 33/02 . Homopolymers or copolymers of acids ; Metal or ammonium salts thereof
- C08L 33/04 . Homopolymers or copolymers of esters { ( C08L 43/04 takes precedence ) }
- C08L 33/06 . . of esters containing only carbon, hydrogen and oxygen, which oxygen atoms are present only as part of the carboxyl radical
- C08L 33/062 . . . { Copolymers with monomers not covered by C08L 33/06 }
- C08L 33/064 . . . . { containing anhydride, COOH or COOM groups, with M being metal or onium-cation }
- C08L 33/066 . . . . { containing -OH groups }
- C08L 33/068 . . . . { containing glycidyl groups }
- C08L 33/08 . . . Homopolymers or copolymers of acrylic acid esters
- C08L 33/10 . . . Homopolymers or copolymers of methacrylic acid esters
- C08L 33/12 . . . . Homopolymers or copolymers of methyl methacrylate
- C08L 33/14 . . of esters containing halogen, nitrogen, sulfur, or oxygen atoms in addition to the carboxy oxygen
- C08L 33/16 . . . Homopolymers or copolymers of esters containing halogen atoms
- C08L 33/18 . Homopolymers or copolymers of nitriles
- C08L 33/20 . . Homopolymers or copolymers of acrylonitrile ( C08L 55/02 takes precedence )
- C08L 33/22 . . Homopolymers or copolymers of nitriles containing four or more carbon atoms
- C08L 33/24 . Homopolymers or copolymers of amides or imides
- C08L 33/26 . . Homopolymers or copolymers of acrylamide or methacrylamide

## C08L33, C09D133, C09J133

- For acrylics, no last place rule, the sub-group is chosen on the basis of the chemical structure of the backbone and/or the functional groups present on the polymer:
- Generic acrylic or methacrylic copolymers:
  - C08L33/08 . . . Homopolymers or copolymers of **acrylic acid esters**
  - C08L33/10 . . . Homopolymers or copolymers of **methacrylic acid esters**
- Presence of a reactive functional group
  - C08L33/064 . . . . { containing anhydride, COOH or COOM groups, with M being metal or onium-cation }  
    **Maleic Anhydride in minority**, otherwise C08L35, with olefin in majority C08L23/0869
  - C08L33/066 . . . . { containing -OH groups } containing **HEMA**
  - C08L33/068 . . . . { containing glycidyl groups } containing **Glycidyl (Meth)acrylate**
  - C08L33/02 . Homopolymers or copolymers of **acids** ; Metal or ammonium salts thereof based on **(Meth)acrylic acid**
- Containing heteroatoms:
  - C08L33/14 . . of esters containing **halogen, nitrogen, sulfur, or oxygen** atoms in addition to the carboxy oxygen (not HEMA)
  - C08L33/16 . . . Homopolymers or copolymers of esters containing **halogen** atoms

## C08L33, C09D133, C09J133

- **C08L 33/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and only one being terminated by only one carboxyl radical, or of salts, anhydrides, esters, amides, imides or nitriles thereof ; Compositions of derivatives of such polymers**
- **C08L33/02** . Homopolymers or copolymers of **acids** ; Metal or ammonium salts thereof based on **(Meth)acrylic acid**
- C08L33/04 . Homopolymers or copolymers of esters { ( C08L43/04 takes precedence ) }
- C08L33/06 . . of esters containing only carbon, hydrogen and oxygen, which oxygen atoms are present only as part of the carboxyl radical
- C08L33/062 . . . { Copolymers with monomers not covered by C08L 33/06 }
- **C08L33/064** . . . . { containing anhydride, COOH or COOM groups, with M being metal or onium-cation }  
**Maleic Anhydride in minority**, otherwise C08L35, with olefin in majority C08L23/0869
- **C08L33/066** . . . . { containing -OH groups } containing **HEMA**
- **C08L33/068** . . . . { containing glycidyl groups } containing **Glycidyl (Meth)acrylate**
- **C08L33/08** . . . Homopolymers or copolymers of **acrylic acid esters**
- **C08L33/10** . . . Homopolymers or copolymers of **methacrylic acid esters**
- **C08L33/12** . . . . Homopolymers or copolymers of **methyl methacrylate**
- **C08L33/14** . . of esters containing **halogen, nitrogen, sulfur, or oxygen** atoms in addition to the carboxy oxygen (not HEMA)
- **C08L33/16** . . . Homopolymers or copolymers of esters containing **halogen** atoms
- C08L33/18 . Homopolymers or copolymers of **nitriles**
- **C08L33/20** . . Homopolymers or copolymers of **acrylonitrile** ( C08L 55/02 takes precedence )
- C08L33/22 . . Homopolymers or copolymers of nitriles containing four or more carbon atoms
- C08L33/24 . Homopolymers or copolymers of amides or imides
- **C08L33/26** . . Homopolymers or copolymers of **acrylamide** or **methacrylamide**
  
- **In red are the sub-groups more frequently used and typical examples**

# EXAMPLE



# 1. US2011/0152402 Thermoplastic composition

(19) **United States**

(12) **Patent Application Publication**

**Jin et al.**

(10) **Pub. No.: US 2011/0152402 A1**

(43) **Pub. Date: Jun. 23, 2011**

(54) **THERMOPLASTIC RESIN COMPOSITION HAVING GOOD SCRATCH RESISTANCE AND MOLDED ARTICLE MADE THEREFROM**

(75) Inventors: **Sung Hun Jin**, Uiwang-si (KR); **Chang Min Hong**, Uiwang-si (KR); **Dong Hui Chu**, Uiwang-si (KR); **Tae Woog Jang**, Uiwang-si (KR); **In Chol Kim**, Uiwang-si (KR); **Yu Ho Kim**, Uiwang-si (KR); **Don Keun Lee**, Uiwang-si (KR)

(73) Assignee: **CHEIL INDUSTRIES INC.**, Gumi-si (KR)

(21) Appl. No.: **12/971,348**

(22) Filed: **Dec. 17, 2010**

(30) **Foreign Application Priority Data**

Dec. 23, 2009 (KR) ..... 2009-129622  
 Nov. 10, 2010 (KR) ..... 2010-111405

**Publication Classification**

(51) **Int. Cl.**  
**C08L 51/04** (2006.01)  
 (52) **U.S. Cl.** ..... **523/122; 525/78; 525/76; 525/75; 525/77; 524/504**

(57) **ABSTRACT**

The present invention provides a thermoplastic resin composition that can have improved scratch resistance comprising: (A) about 10 to about 20% by weight of a rubber modified aromatic vinyl graft copolymer resin; (B) about 30 to about 50% by weight of polymethylmethacrylate (PMMA) resin; and (C) about 40 to about 60% by weight of an aromatic vinyl copolymer resin including about 5 to about 50% by weight of a (meth)acrylate alkyl ester. The thermoplastic resin composition of the present invention can have a good balance of various properties such as scratch resistance, impact strength, colorability, gloss, and injection molding properties.



# 1. Thermoplastic composition

## EXAMPLES

[0047] The base resins used in Examples and Comparative Examples are prepared as follows.

[0048] (A) Core-Shell Rubber Modified Aromatic Vinyl Graft Copolymer Resin

[0049] The core-shell rubber modified aromatic vinyl graft copolymer resin (A) of the examples and comparative examples of the present invention is a core-shell g-ABS copolymer resin having an average particle diameter of 300 μm which is prepared by emulsion graft polymerization of 58 parts by weight of polybutadiene rubber latex, 36 parts by weight of acrylonitrile, and 65 parts by weight of styrene.

[0050] (B) Polymethylmethacrylate (PMMA) Resin

[0051] A polymethylmethacrylate (PMMA) resin having a weight-average molecular weight of 85,000 and including 88 parts by weight of methyl methacrylate monomer and 12 parts by weight of methacrylic acid is used.

[0052] (C) Aromatic Vinyl Copolymer Resin Including a (Meth)Acrylate Alkyl Ester

[0053] A M-SAN resin having a weight-average molecular weight of 80,000 and including 20 parts by weight of methyl methacrylate monomer, 20 parts by weight of acrylonitrile monomer, and 70 parts by weight of styrene monomer is used.

[0054] (D) Methyl Methacrylate-Styrene (MS) Resin

[0055] (d1) MS-300 including 30% by weight methyl methacrylate styrene resin produced by NIPPON STEEL CORPORATION is used.

[0056] (d2) MS-320XL including 20% by weight methyl methacrylate styrene resin produced by NIPPON STEEL CORPORATION is used.

- (A): C08L55/02
- (B): C08L33/12
- (C): C08L25/14

Combination Set: C08L25/14, C08L33/12, C08L55/02

Combination Set: C08L33/12, C08L25/14, C08L55/02

Single symbol Invention: C08L25/14; C08L33/12

Single symbol Additional C08L2205/03

TABLE 1

	Examples				Comparative Examples		
	1	2	3	4	1	2	3
(A) g-ABS	11	13	15	17	—	15	22
(B) PMMA	35	37	35	43	100	—	—
(C) M-SAN	54	50	50	40	—	—	—
(D) MS (d1)	—	—	—	—	—	85	—
(d2)	—	—	—	—	—	—	78

(unit: wt %)