Combination sets

Fields of Olefin- Vinylic- Acrylic- and Grafts- Polymers
C08F10 to 301
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## Organisation in C08F:

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Breakdown codes: 2000-Codes in CPC

- 2000-codes come from the conversion of a previously used codification of monomers present in minority and coded for additional information (previous orthogonal ICO codes M08F).
- Said codification had more entries than the C08F trunk (deeper indexing, more sub-groups) than the C08F trunk.

For example:
- C08F 220/10 . . Esters
- C08F 220/12 . . . of monohydric alcohols or phenols
- C08F 220/14 . . . Methyl esters
- C08F 220/16 . . . of phenols or of alcohols containing two or more carbon atoms
- C08F 220/18 . . . with acrylic or methacrylic acids
- C08F 2220/1808 . . . . Ethyl or undefined short-chain (meth)acrylate
- C08F 2220/1816 . . . . Propyl(meth)acrylate
- C08F 2220/1825 . . . . Butyl(meth)acrylate
- C08F 2220/1833 . . . . Pentyl or undefined long chain (meth)acrylate
- C08F 2220/1841 . . . . Hexyl(meth)acrylate
- C08F 2220/185 . . . . Heptyl(meth)acrylate
- C08F 2220/1858 . . . . (iso)Octyl(meth)acrylate
- etc...
Organisation of the groups in C08F: based on chemical structure of the substituents on the double bond of the monomers

listed according to the nature of the substituent(s) present on the double bond in an order such as: R= H, C, X, O, CO2, (CO)N, N, P
Polyolefins, Styrenics, Vinyl Halides

for example polyolefins
– C08F210/00 alkenes (ethylene, propylene...): R= H; Alk
– C08F212/00 styrenics: R= Phenyl
– C08F214/00 vinyl halides: R=Cl, F...
Vinyl alcohols, ethers and esters

- C08F216/00 vinyl alcohols and ethers thereof, leading to polyvinyl alcohols, polyvinyl ethers (R= H, Alk..)

- C08F218/00 vinyl esters (e.g. leading to polyvinyl acetates) (R= (C=O)-Alk)
Vinyl alcohols, ethers and esters

**C08F 216/00**  Vinyl Alcohols, vinyl ethers

- **C08F 216/02**  by an alcohol radical
- **C08F 216/04**  Acyclic compounds
- **C08F 216/06**  Polyvinyl alcohol; { Vinyl alcohol }
- **C08F 216/08**  Allyl alcohol
- **C08F 2216/085**  Allyl alcohol alkoxylate
- **C08F 216/10**  Carbocyclic compounds
- **C08F 216/12**  by an ether radical
- **C08F 216/125**  Monomers containing two or more unsaturated aliphatic radicals
- **C08F 216/14**  Monomers containing only one unsaturated aliphatic radical
- **C08F 216/1408**  Monomers containing halogen
- **C08F 216/1416**  Monomers containing oxygen in addition to the ether oxygen
- **C08F 2216/1425**  Monomers containing side chains of polyether groups
- **C08F 2216/1433**  Monomers containing side chains of polyethyleneoxide groups
- **C08F 2216/1441**  Monomers containing side chains of polypropyleneoxide groups
- **C08F 2216/145**  Monomers containing side chains of polyethylene-co-propyleneoxide groups
- **C08F 216/1458**  Monomers containing nitrogen
- **C08F 216/1466**  Monomers containing sulfur
- **C08F 2216/1475**  Monomers containing sulfur and oxygen
- **C08F 2216/1483**  Monomers containing sulfur and nitrogen
- **C08F 2216/1491**  Monomers containing sulfur, oxygen and nitrogen
- **C08F 216/16**  Monomers containing no hetero atoms other than the ether oxygen
- **C08F 216/165**  Carbocyclic compounds
- **C08F 216/18**  Acyclic compounds
- **C08F 216/20**  Monomers containing three or more carbon atoms in the unsaturated aliphatic radical
- **C08F 216/34**  by an aldehydo radical
- **C08F 216/36**  by a ketonic radical
- **C08F 216/38**  by an acetal or ketal radical

**C08F 218/00**  Vinyl esters

- **C08F 218/02**  Esters of monocarboxylic acids
- **C08F 218/04**  Vinyl esters
- **C08F 218/06**  Vinyl formate
- **C08F 218/08**  Vinyl acetate
- **C08F 218/10**  Esters of monocarboxylic acids containing three or more carbon atoms
- **C08F 218/12**  Esters of polycarboxylic acids
- **C08F 218/14**  Esters containing halogen
- **C08F 218/16**  Esters containing nitrogen
- **C08F 218/18**  Esters containing three or more carbon atoms
- **C08F 218/20**  Esters containing halogen
- **C08F 218/22**  Esters containing nitrogen
- **C08F 218/24**  Esters of carbonic or haloformic acids
- **C08F 218/245**  Esters of carbonic or haloformic acids, e.g. allyl carbonate
(Meth)acrylic acid, esters, amides, nitriles

C08F220/00 Acrylic and methacrylic acid, esters, nitriles or amides, see table \((R= \text{OH}, \text{OAlk}, \text{NRR’}, \text{CN}...)\)
(Meth)acrylic acid, esters, amides, nitriles

**C08F220/02** . Monocarboxylic acids having less than ten carbon atoms; Derivatives thereof
**C08F220/04** . Acids; Metal salts or ammonium salts thereof
**C08F220/06** . Acrylic acid; Methacrylic acid; Metal salts or ammonium salts thereof
**C08F220/08** . Anhydrides
**C08F220/10** . Esters
**C08F220/12** . of monohydric alcohols or phenols
**C08F220/14** . . Methyl esters MMA
**C08F220/16** . . of phenols or of alcohols containing two or more carbon atoms
**C08F220/18** . . with acrylic or methacrylic acids
**C08F220/1808** . . . Ethyl(meth)acrylate
**C08F220/1816** . . . . Propyl(meth)acrylate
**C08F220/1825** . . . . Butyl(meth)acrylate
**C08F220/1833** . . . . Pentyl(meth)acrylate
**C08F220/1841** . . . . Hexyl(meth)acrylate, phenyl (meth)acrylate
**C08F220/185** . . . . Heptyl(meth)acrylate, benzyl (metha)crylate
**C08F220/1858** . . . . (iso)Octyl(meth)acrylate, 2-ethylhexyl(meth)acrylate
**C08F220/1866** . . . . CB-(meth)Acrylate
**C08F220/1875** . . . . (iso)Decyl(meth)acrylate, isobornyl(meth)acrylate
**C08F220/1883** . . . . Lauryl(meth)acrylate
**C08F220/1891** . . Longer chain (meth)acrylate
**C08F220/20** . . . of polyhydric alcohols or phenols
**C08F220/22** . . . . 2-hydroxyethyl (meth)acrylate, hydroxypropyl (meth)acrylate, glycerol(meth)acrylate
**C08F220/24** . . . containing perhaloalkyl radicals PFA(Meth)Acrylates
**C08F220/26** . . . . Esters containing oxygen in addition to the carboxy oxygen
**C08F220/28** . . . . containing no aromatic rings in the alcohol moiety
**C08F220/281** . . . and containing only one oxygen, 2-methoxyethyl(meth)acrylate
**C08F220/282** . . . and containing two or more oxygen atoms
**C08F220/283** . . . and containing one or more carboxylic moiety in the chain Acetoacetyl-(meth)acrylate
**C08F220/285** . . . and containing an ether chain in the alcohol moiety
**C08F220/286** . . . and containing polyethyleneoxide in the alcohol moiety PEGMA
**C08F220/287** . . . and containing polypropyleneoxide in the alcohol moiety
**C08F220/288** . . . and containing polypropylene-co-ethylene oxide in the alcohol moiety
**C08F220/30** . . . containing aromatic rings in the alcohol moiety
**C08F220/301** . . . and one oxygen in the alcohol moiety
**C08F220/302** . . . and two or more oxygen atoms in the alcohol moiety
**C08F220/303** . . . and one or more carboxylic moieties in the chain
**C08F220/305** . . . and ether chain in the alcohol moiety
**C08F220/306** . . . and polyethyleneoxide chain in the alcohol moiety
**C08F220/307** . . . and polypropylene oxide chain in the alcohol moiety
**C08F220/308** . . . and polyethylene-co-propylene oxide chain in the alcohol moiety
**C08F220/32** . . . containing epoxy radicals
**C08F220/325** . . . containing glycidyl radical GMA: glycidyl methacrylate
(Meth)acrylic acid, esters, amides, nitriles

- Esters containing nitrogen, N,N-dimethylaminoethyl(meth)acrylate
- Esters in the form of urethane links
- Esters containing further oxygen
- Esters containing oxygen in addition to the carboxy oxygen, 2-N-morpholinoethyl(meth)acrylate or 2-isocyanatoethyl(meth)acrylate
- Esters containing further carboxylic moieties
- Esters containing sulfur
- Esters containing oxygen, 2-sulfoethyl(meth)acrylate
- Esters containing nitrogen and oxygen
- Esters of unsaturated alcohols, Allyl Acrylate
- Nitriles
- Acrylonitrile
- Acids, sulfonic acids or salts thereof
- Amides or imides
- Amides, N,N-dimethylacrylamide or N-isopropylacrylamide
- Acrylamide; Methacrylamide
- N-Methylol AA, N-acryloyl morpholine
- and containing other heteroatoms, AMPS
- and containing nitrogen in addition to the carbonamido nitrogen
- and containing oxygen in addition to the carbonamido oxygen and nitrogen
- Monocarboxylic acids having ten or more carbon atoms; Derivatives thereof
- Acids, Metal salts or ammonium salts thereof
- Anhydrides
- Esters
- Nitriles; Amides; Imides
Maleates and di- or polyfunctionals

- C08F 222/00 Copolymers of compounds having one or more unsaturated aliphatic radicals each having only one carbon-to-carbon double bond, at least one being terminated by a carboxyl radical and containing at least one other carboxyl radical in the molecule; Salts, anhydrides, esters, amides, imides or nitriles thereof

- Maleic anhydride, maleic acids, esters, diallyl maleate, nitriles, imides thereof

- Esters of polyhydric alcohols: ethylene glycol dimethacrylate...(C08F222/1006)
Maleates and di- or polyfunctionals

- C08F 222/00 Copolymers of compounds having one or more unsaturated aliphatic radicals each having only one carbon-to-carbon double bond, at least one being terminated by a carboxyl radical and containing at least one other carboxyl radical in the molecule; Salts, anhydrides, esters, amides, imides or nitriles thereof

C08F 222/00
C08F 222/02 . Acids; Metal salts or ammonium salts thereof: maleic acid, itaconic acid...
C08F 222/04 . Anhydrides, e.g. cyclic anhydrides
C08F 222/06 . Maleic anhydride
C08F 222/08 . with vinyl aromatic monomers maleic/styrene
Maleates and di- or polyfunctionals

- Maleates and di- or polyfunctionals

- Esters of polyhydric alcohols
- Esters of dialcohols: Ethylene glycol di(meth)acrylate, 1,4-butanediol dimethacrylate
- Esters of aromatic dialcohols
- Esters of trialcohols: Trimethylpropane tri(meth)acrylate
- Esters of aromatic trialcohols
- Esters of tetraalcohols: Pentaerythritol tetra(meth)acrylate
- Esters of aromatic tetraalcohols
- Esters of trialcohols: Trimethylolpropane tri(meth)acrylate
- Esters of aromatic trialcohols
- Esters of tetraalcohols: Pentaerythritol tetra(meth)acrylate
- Esters of aromatic tetraalcohols
- Esters of trialcohols: Trimethylolpropane tri(meth)acrylate
- Esters of aromatic trialcohols
- Esters of pentaalcohols
- Esters of aromatic pentaalcohols
- Esters of polycondensation macromers
- Esters of alcohol terminated polyesters or polycarbonates: acrylic polyesters
- Esters of alcohol terminated polyethers
- Esters of alcohol terminated (poly)urethanes: urethane (meth)acrylates
- Esters of alcohol terminated epoxy functional polymers: epoxy polyacrylates
- Esters of phenols or saturated alcohols
- Esters having no free carboxylic acid groups: dialkyl maleate, fumarate, itaconate...
- Esters having free carboxylic acid groups: monoalkyl maleate, fumarate, itaconate...
- Esters containing halogen
- Esters containing oxygen in addition to the carboxy oxygen
- Esters containing nitrogen
- Esters containing sulfur
- Esters of unsaturated alcohols
- Diallyl maleate
- Nitriles
- Alfa-Cyano-acrylic acid; Esters thereof
- Alfa-Cyano-acrylic acid methyl ester
- Alfa-Cyano-acrylic acid ethyl ester: 2-ethylcyanoacrylate
- Alfa-Cyano-acrylic acid propyl ester
- Alfa-Cyano-acrylic acid butyl ester
- Alfa-Cyano-acrylic acid pentyl ester
- Alfa-Cyano-acrylic acid longer chain ester
- Alfa-Cyano-acrylic acid alkoxy ester
- Alfa-Cyano-acrylic acid with more than one oxygen in the ester moiety
- Vinylidene cyanide
- Amides or imides
- Amides
- Amides
- Imides, e.g., cyclic imides
- Alkyl substituted imides
- the substituted imides comprising oxygen other than the carboxy oxygen
- the substituted imides comprising nitrogen other than the imide nitrogen
- the substituted imides comprising other heteroatom
Heterosubstituted...

- C08F 224/0 containing hetetrocyclic ring containing oxygen (not acrylates)

\[
\begin{align*}
\text{NR}_1\text{R}_2 & \quad \text{SR} & \quad \text{P, B, Si, Ge} \\
\text{C08F 226/00} & \quad \text{C08F 228/00} & \quad \text{C08F 230/00}
\end{align*}
\]
Heterosubstituted...

\[
\begin{align*}
\text{C} & \text{08F 224/00} & \text{C} & \text{08F 226/00} & \text{C} & \text{08F 228/00} \\
\text{C} & \text{08F 226/02} & \text{C} & \text{08F 226/04} & \text{C} & \text{08F 226/06} \\
\text{C} & \text{08F 226/08} & \text{C} & \text{08F 226/10} & \text{C} & \text{08F 226/12} \\
\text{C} & \text{08F 228/02} & \text{C} & \text{08F 228/04} & \text{C} & \text{08F 228/06} \\
\text{C} & \text{08F 230/02} & \text{C} & \text{08F 230/04} & \text{C} & \text{08F 230/06} \\
\text{C} & \text{08F 230/08} & \text{C} & \text{08F 230/085} & \text{C} & \text{08F 230/10} \\
\end{align*}
\]

- **C08F 226/00** terminated by a heterocyclic ring containing oxygen
- **C08F 226/02** by a single or double bond to nitrogen
- **C08F 226/04** diallylamine
- **C08F 226/06** by a heterocyclic ring containing nitrogen
- **C08F 226/08** N-vinyl pyridine, N-vinyl imidazole
- **C08F 226/10** N-vinyl pyrrolidone
- **C08F 226/12** N-vinyl carbazole

- **C08F 228/00** terminated by a bond to sulfur or by a heterocyclic ring containing sulfur
- **C08F 228/02** by a bond to sulfur
- **C08F 228/04** thioethers
- **C08F 228/06** by a heterocyclic ring containing sulfur

- **C08F 230/00** containing metal
- **C08F 230/02** containing phosphorus
- **C08F 230/04** containing a metal
- **C08F 230/06** containing boron
- **C08F 230/08** the monomer being a polymerisable additive
- **C08F 230/085** the monomer being a polymerisable additive, (meth)acryloxy trialkoxy silanes or vinyl trialkoxysilanes
- **C08F 230/10** containing germanium
- C08F232/00 unsaturated carbocyclic ring
- C08F234/00 unsaturated heterocycles
- C08F236/00: dienes
- C08F238: acetylenes
- C08F240: copolymers of hydrocarbons and mineral oils
- C08F242/00: drying oils with other monomers
- C08F244/00: Coumarone-indene
Special rules of classification, see **CPC-definition**

Rule:
- *In a copolymer, the monomer in majority is given an Indexing Code and the monomer(s) in minority are given Indexing Code(s) in the form of a Combination Set. The Indexing Codes are linked.*
- *The monomer in majority is always indicated first in the Combination set.*

Example: a copolymer having MMA in majority and MAc in minority is classified in:

**Single symbol invention:**  **C08F220/14**

**Combination Set:**  **C08F220/14, C08F220/06**

In the Combination sets, it is the first symbol that determines whether the whole Combination set is INV(ention) or ADD(itional).
Main trunk vs 2000-codes in CPC, INV or ADD?

Rule:

- In a copolymer, the monomer in **majority** is given an Indexing Code and the monomer(s) in **minority** are given Indexing Code(s) in the form of a **Combination Set**. The Indexing Codes are linked.
- The monomer in majority is always indicated **first** in the Combination set.

  - The monomer in majority receives a Single Symbol /CI (INV), the monomers in minority an /CL (ADD) in the form of a **Combination set**

  - In principle CPC allows using the whole CPC classification as **INV** or **ADD**
  - All C08F20,120,220 (main trunk) may be used as **INV** or **ADD**

However:

- C08F2220 can **only** be used as **ADD**
- As the Combination sets is used to specify the co-monomers with highest precision, the whole scheme should be used (interleaved C08F200 and C08F2000) and the Combination set is given as **ADD**
Special rules of classification, see CPC-definition

Rule: *In a copolymer, the monomer in majority is given an Indexing Code and the monomer(s) in minority are given Indexing Code(s) in the form of a Combination Set. The Indexing Codes are linked. The monomer in majority is always indicated first in the Combination set.*

Example
A copolymer of
- 50 wt % Butyl acrylate
- 30 wt % Methyl Methacrylate
- 20wt % Acrylic acid

Will receive a Combination set Additional: C08F2220/1825, C08F220/14, C08F220/06 And as Single Symbol Invention: C08F220/18 (for (Butyl) acrylate, use the Main Group)
Classification in practice:

- The classes are given on the basis of the chemical structure of the monomers engaged in the polymerisation
- Give the lowest and more appropriate sub-group wrt chemical structure, do not use main-groups unless not otherwise possible

- We give Combination Sets only when the polymerisation or the structure of the copolymer is explicitly disclosed in the document, either in the general description or in the examples (not for hypothetic polymers or lists of possible monomers that may be used), seldom from claims.

- Ideally, we classify all examples, also when the examples are using comonomers which are in different groups (e.g. ethylene-vinyl acetate, styrene-acrylates..)

- In the documents containing many examples, each comonomer used should appear in at least one Combination Set.

- We classify random copolymers, however graft and block are also considered, see below

- Pay attention to neighbouring fields epoxies, polyurethanes, coatings, adhesives, cosmetics
Grafts: C08F251/00 to C08F292/00: Base symbol on the basis of the **backbone** polymer in the graft

- C08F251/00: onto polysaccharides
- C08F253/00: onto natural rubbers
- C08F255/00: onto polymers of C08F10 (polyolefins)
- C08F257/00: onto polymers of C08F12 (Styrenics)
- C08F259/00: onto polymers of C08F14 (vinyl halides)
- C08F261/00: onto polymers of C08F16 (vinyl alcohols, ethers)
- C08F263/00: onto polymers of C08F18 (vinyl acetates, esters)
- C08F265/00: onto polymers of C08F20/00 (acrylics)
- C08F267/00: onto polymers of C08F22/00 (maleics..)
- C08F269/00-C08F281/00: onto polymers of C08F24/00 to C08F38/00
- C08F283/00: onto polymers of C08G
- C08F285/00: onto preformed graft polymers
- C08F287/00: onto Block copolymers
- C08F289/00: onto polymers not provided for in C08F251/00 to C08F284/00
- C08F290/00: onto polymers modified by introduction of aliphatic unsaturated end or side groups
- C08F291/00 onto polymers according to more than one of groups C08F251/00 to C08F289/00
- C08F292/00: onto inorganic materials
**Grafts**: C08F251/00 to C08F292/00

- **Special rules of classification within this group**
  - In C08F251/00 to C08F292/00, the *grafted monomer* may be indicated using the subdivision of C08F210/00 to C08F238/04 in the form of a **Combination Set**:
  - e.g. *cellulose* grafted with *styrene* will be classified in Combination Set C08F251/02, C08F212/08
  - This specification of the grafted monomer is used when the monomer is specified in the claims or in the examples.
  - If several monomers are grafted, the monomer in **majority** is indicated unless interesting information is present in a **minor** co-monomer, such as monomer bearing reactive functional group or if the monomer is a **crosslinker**, e.g. diacrylate, it is important to indicate it in a Combination Set.
  - If the polymer to be grafted is a **copolymer**, the base symbol corresponding to the backbone component in majority is given.
  - In cases of co-grafting, i.e. a monomer is reacted in the presence of two backbone polymers, both symbols related to the backbone are given.
  - For example co-grafting of a monomer onto a polyethylene and a polysiloxane will be classified in C08F255/02 and C08F283/12 i.e. in two Combination sets,
  - For core shell polymers, the order of addition is considered for classification. If a seed polymer is used, it is normally ignored for classification.
Grafts: C08F251/00 to C08F292/00

• **Special rules of classification within this group**

  • Example: A core shell polymer obtained by:
  1) polymerization of styrene into polystyrene
  2) polymerization of acrylic acid in the presence of the polymer obtained in step 1)
     Combination set: C08F257/02, C08F220/06

  • Example: If the polymer to be grafted is a copolymer, the symbol corresponding to the backbone component in majority is given
  1) ethylene/ acrylic acid (80/20) copolymer
  2) grafted with MMA:
     Combination set: C08F255/02, C08F220/14

• Long chain PEGMA is considered as a polymer (C08F290/062), also, colloidal stabilisers such as PVOH (C08F261/04)
Most important neighbouring fields

- Compositions of polymers: C08L: Mixtures of two polymers in a composition
  - C08L29: Polyvinyl alcohols...
  - C08L31: Polyvinyl acetates...
  - C08L33: Poly(meth)acrylates...
  - C08L35: Maleates...
- Additives (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)
Other fields where Acrylic polymers are used:

- Cosmetic compositions based on polyacrylic polymers:
  - A61K8/8152
  See also
  - A61Q5/00 (preparation for hair, hair treatment)
  - A61Q19/00 (preparation for skin, skin treatment)
  - A61K2800/548 (associative polymers)
- Superabsorbent: A61L15/60, A61F13/15
- Cement additives: C04B24/2641, /2647(comb acrylates)
- PSA. C09J7/0217 C09J2201/606 and /61 hot melt
- Flocculants for water treatment: C02F1/56
- Compositions for drilling of boreholes or well: C09K8/5083
- Detergent compositions: C11D3/37, /3757
- Binders for fibres: D06M15/21, D04H1/64
- Contact lenses: G02B1/04
- Fuel cell membranes H01M8/102, Electrolytes: H01M2300/0082
- Photoresists
Tips for search

- In acrylics, Combination sets have been given as from April 2012
- For earlier documents, no Combination sets were given
- Before 04/2012, second or further symbol(s) given as separate additional symbol(s)

- (Meth)acrylic acid, in principle in C08F220/06, in the past sometimes in C08F220/02 /04
- Hydroxy alkyl (meth)acrylates, in principle in C08F220/20, in the past also in C08F220/28xx
- Di-Poly-acrylates (EGDMA, TMPTA..) in the past systematically in M08F222/10b, now spited in C08F(2)222/10xx, search with C08F222/10??
- Double bonds terminated by an O or N ctg heterocyclic compounds, in C08F224/00, C08F226/00, attn C08F220 takes precedence
- Silicium containing monomers: C08F230/08
- Now vinyl alkoxy silanes and acryloyloxy alkoxy silanes: C08F2230/085
Tips for search

• **Acrylic polyols** for 2K PU:
  • Monomers may be in C08F220/20 or C08F220/28xxx (HEMA)
  • Compositions may be in C08L33/xxx in principle C08L33/066
  • If used as coating composition, may be in C09D133/xxx (/066) or in C09D175/00 or /04
  • Remark: the polyol itself may also be in C08G18/62(25)... if classified by polyurethanes

• **Core-shell or multistep** processes may be in grafts: e.g C08F265/06
  • Polymerisation using PEGMA may be in C08F290/062
  • Remark: compositions thereof in C08L51/00
EXAMPLE
USE OF SYNTHETIC ADHESIVES IN THE MANUFACTURE OF CORRUGATED FIBERBOARD

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ABSTRACT

Described is the use of synthetic adhesives in the manufacture of corrugated fiberboard at relatively low temperatures and high lineal speeds. The corrugated fiberboard includes a corrugated sheet of paper and a flat linerboard and the corrugation of the corrugated sheet of paper is produced at paper temperatures below 95°C and at a lineal speed above 150 m/min. The production of the corrugation of a corrugated sheet of paper is immediately followed by a continuous operation in which a preferably unheated corrugated board adhesive is applied and the corrugated sheet of paper is adhered to at least one first linerboard. The corrugated board adhesive used is an aqueous adhesive dispersion based on at least one synthetic, dispersed polymer having preferably more than 40% by weight solids content, selected from acrylic copolymers, copolymers of vinylaromatics and conjugated aliphatic dienes and vinyl acetate-alkylene copolymers, wherein the glass transition temperatures of the polymers are above 20°C and (preferably at least 5°C) below the surface temperature of the corrugated sheet of paper to which they are applied.
US2011/0247746 Acrylic dispersions: Polymerisation and adhesives

Inventive Example 1

Copolymer formed from 39.5 parts by weight of n-butyl acrylate, 56.5 parts by weight of styrene, 4 parts by weight of methacrylic acid, emulsion polymerized in water in the presence of 0.1 part by weight of tert-dodecyl mercaptan, 1.2 parts by weight of Dispomat® FES 27 emulsifier, 0.25 part by weight of Dowfax 2A1 emulsifier, 0.6 part by weight of sodium persulfate (initiator).

Solids content: 40%, pH 6.2, Tg 41°C.

Inventive Example 3

Copolymer formed from 38 parts by weight of n-butyl acrylate, 55 parts by weight of styrene, 5 parts by weight of vinyl acetates, 2 parts by weight of acrylic acid, emulsion polymerized in water in the presence of 0.1 part by weight of tert-dodecyl mercaptan, 1.2 parts by weight of Dispomat® FES 27 emulsifier, 0.25 part by weight of Dowfax 2A1 emulsifier, 0.6 part by weight of sodium persulfate (initiator).

Solids content: 40%, pH 4.0, Tg 35°C.

Inventive Example 10

Copolymer formed from 56.5 parts by weight of styrene, 32.0 parts by weight of butadiene, 11 parts by weight of acrylic acid; 0.5 part by weight of itaconic acid, emulsion polymerized in water in the presence of 1.1 parts by weight of tert-dodecyl mercaptan, 0.5 part by weight of Lumilen 1-SC, 0.9 part by weight of sodium persulfate.

Solids content: 52%, pH 5.0, Tg 26°C.

Styrene, n-Butyl acrylate, Methacrylic acid

Combination Set: C08F212/08, C08F2220/1825, C08F220/06

Styrene, n-Butyl acrylate, Vinyl acetate, Methacrylic acid

Combination Set: C08F212/08, C08F2220/1825, C08F218/08, C08F220/06

Styrene, Butadiene, Methacrylic acid, Itaconic acid

Single Symbol: C08F212/08

Combination Set: C08F212/08, C08F236/10, C08F220/06, C08F222/02