
Universal Decimal Classification

English full edition
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UDC 621.7 Plastic or chipless working, forming and treatment of materials

Classification Décimale Universelle
CDU 621.7 Façonnage, formage et traitement
des matériaux sans enlèvement

Dezimalklassifikation
DK 621.7 Spanlose Umformung, Formgebung und
Behandeln von Werkstoffen

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Foreword

The English version of the Universal Decimal Classification (UDC) is being prepared and published by the British Standards Institution (BSI) at the original joint request of the British Society for International Bibliography (BSIB) and the Association of Special Libraries and Information Bureaux (ASLIB), now amalgamated as Aslib. It has the approval of the Lake Placid Education Foundation, New York, proprietors of the Dewey Decimal Classification, from which the UDC derives. The first English Full Edition is the fourth International edition authorized by the International Federation for Documentation (FID), The Hague, Netherlands.

This section is part of the English Full Edition. It should be used in conjunction with the Abridged English Edition, BS 1000A, which refers to many other

subjects of interest not listed in this schedule, and provides a conspectus of the whole scheme, together with an introduction to its use. For further practical information about the principles, application and utilization of the scheme, users should refer to BS 1000C.

This edition of UDC 621.7 includes modifications authorized in 'Extensions and Corrections to the UDC' up to and including Series 9, No. 2, dated March 1976. Subsequent issues of 'Extensions and Corrections to the UDC' should be consulted to keep the schedule up to date. Further information about this and other UDC publications is given on page 35. British Standards related to this part of BS 1000 are listed on the inside back cover.

Scope

Under 621.7 is classed information about processes, tools, machines and equipment used in plastic or chipless working, forming and treatment of materials including finishing, storing and packaging. Working and

machining with chip formation (removal of material), cutting, grinding and sheet-working are classed under 621.9.



Amendment Slip No.1
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Universal Decimal Classification. English full edition
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treatment of materials

Corrections

AMD 3003
May 1979

Foreword

In paragraph 3, line 3, delete 'Series 9, No. 2, dated March 1976' and substitute 'Series 10, No. 1, dated June 1978'.

AMD 3003
May 1979

Schedule

New entry

Insert the following above 621.7.019: '018 Working allowances'.

621.753.1

Delete 'Working allowances'.

621.793

After 'FILMS' insert 'METALLIZATION'.

AMD 3003
May 1979

Alphabetical subject index

After 'Allowances', delete '621.753.1' and substitute '621.7.018'.

Below 'Working', after the subheading 'allowances', delete '621.753.1' and substitute '621.7.018'.

Below 'Working', delete 'tolerances 621.753.1'.

Related subjects

- 531.7 Measurement of geometrical and mechanical quantities. Instruments. Methods. Units.
- 620.1 Materials testing. Defects of materials. Protection of materials.
- 621.6 Fluids handling, storage and distribution plant and equipment.
- 621.8 Mechanical power transmission. Machine elements. Gearing. Materials handling. Mechanical attachments, fixings, fasteners. Lubrication.
- 621.9 Working, machining with chip formation. Cutting, grinding, sheet-working.
- 658.5 Organization of production. Production planning, management and control. Design.
- 658.78 Stock control. Storing. Despatch.
- 669 Metallurgy.
- 682 Smithery. Farriery. Hand-forged ironwork.
- 686.4 Metallizing : gilding, silvering, bronzing, metallic varnishing.

prevent the concealment of information. This usually results in longer notation, however, and for information for more restricted use, the application of auxiliaries, where available, may be simpler and more convenient provided that there is an adequate alphabetical subject index.

Common auxiliaries. The common auxiliaries of language = . . . , form (0 . . .), place (1/9), race and nationality (= . . .), time “ . . . ”, point of view. 00 . . . , materials –03 . . . and persons –05 . . . are applicable throughout the UDC. However, they should be used mainly to express concepts not otherwise provided for in the schedules.

Special auxiliaries. In general, the .0 special auxiliaries listed at 621.7 are applicable throughout the schedule. * They may be detached and applied to any subdivision where the result forms a meaningful combination. Special auxiliaries are also provided at many subdivisions of 621.7 ; these may be applied to any subdivision of the number at which they are listed. The –1/–9 special auxiliaries listed at 62 are applicable throughout the schedule.

Auxiliary signs and subdivisions

Full information about the common and special auxiliary signs and subdivisions (often abbreviated to ‘common and special auxiliaries’) will be found in BS 1000A and BS 1000C.

Colon sign of relation. For the classification of information for the public, as in abstracts and bibliographies, maximum use of colon combinations rather than of common or special auxiliaries is recommended. The use of the colon sign of relation is preferable for multiple entry systems, as it will help

Typographic presentation

Small type is used for cancelled numbers and text.

The arrow → means either ‘see’ or ‘see also’ according to the context.

The symbol $\cong$ ‘subdivide as’ means that the number preceding it may be subdivided in the same way as, and with meanings analogous to the subdivisions of, the number which follows it.

*But see the notes under 621.7.012, 621.7.013, 621.7.014, 621.7.04, 621.7.06 and 621.7.08

SCHEDULE

621.7 PLASTIC OR CHIPLESS WORKING, FORMING AND TREATMENT OF MATERIALS IN GENERAL : PROCESSES, TOOLS, MACHINES, EQUIPMENT

Special auxiliary subdivisions

621.7-1/-9	DETAILS OF MACHINES, TOOLS, EQUIPMENT, PROCESSES ETC 621.7-1/-9 $\cong$ 62-1/-9, e.g. 621.7-1 General characteristics of machines, apparatus and equipment	621.7-7 Servicing, maintenance, protection of machines
		-78 Protection devices and protective measures for operating personnel and the public
-11	General design and construction characteristics	-97 Thermal characteristic data. Temperature or temperature range
-111	Machines and equipment according to the alignment of the working axis	-98 Pressure characteristics, variables, level, range
	.1 Vertical	-982 Vacuum. In vacuo
	.2 Horizontal	
	.3 Inclined. Oblique	
-112	Machines and equipment according to the type of construction	621.7.01 PRINCIPLES AND THEORY OF WORKING AND TREATMENT OF WORKPIECES. WORKABILITY. FACTORS INFLUENCING WORKING. CONDITIONS. FAULTY WORKING
	.3 Self-supporting construction	.011 Workability. Formability. Stresses, flow etc <i>Further particulars may be denoted by colon combination with the subdivisions of 539</i>
	.4 Simple construction, e.g. monobloc (one-piece)	.012 Working movement, stroke or travel : effect on working etc <i>These special auxiliaries are not applicable to 621.745 or 621.78, where .012 has a different meaning</i>
	.5 Sectional, dismantlable, built-up, multi-unit construction	.2 Height of drop, e.g. of forge hammers
	.6 Prefabricated, unit construction	.3 Length of stroke, travel or traverse
-113	Machines and equipment for single-workpiece machine tools	.4 Width, breadth of stroke
-114	Machines and equipment for multiple operation or movement, e.g. multi-workpiece machine tools	.5 Depth of stroke : shallow/deep working →621.7.014.4 Penetration of tool
-115	Multi-purpose machines and equipment. Universal machines, tools	.013 Angle, rake of tool. Direction of working <i>These special auxiliaries are not applicable to 621.78, where .013 is used with a different meaning</i>
-18	Characterization according to dimensions, speed and other magnitudes	.2 Angular set, inclination of tool
-182	Characterization according to mobility etc	.3 Rake of tool : top-rake, side-rake
	.2 Permanent. Fixed. Stationary. Static	.4 Clearance angle : positive, negative stroke or cut
	.3 Mobile. Transportable	.5 Working along the grain
	.4 Portable	.6 Working across the grain
-187	Characterization according to precision <i>For measurement</i> → 621.7.08 <i>For tolerances, limits, gauges</i> → 621.753	.014 Efficiency of tool, machine : influencing factors, power required <i>These special auxiliaries are not applicable to 621.78, where .014 is used with a different meaning</i>
-2	Fixed and movable components of machines	.2 Resistance of material : frictional resistance etc →621.7.011 Workability. Formability. Stresses, flow etc
-21	Fixed components. Enclosures. Housings. Casings. Frames. Mountings etc	.3 Pressure applied to tool
-216	Elements of housings, frames, mountings etc	.4 Penetration of tool →621.7.012.5 Depth of stroke : shallow/deep working
-4	State, condition, form of materials, surfaces, objects, products	.5 Rate of working. Speed of machine, tool <i>Further particulars may be denoted by the -185 special auxiliaries listed at 62</i>
-5	Operation and control of machines and processes	.8 Formation of chips, flakes, flour, dust and other waste products →621.775.8 Chippings, fibres and metal wool manufacture
-51	General operation and control of machines and processes. Manual and remote control	.015 Surface finish. Resultant condition of workpiece <i>For specific subdivisions relating to heat treatment</i> → 621.78.015 <i>The degree of precision may be denoted by the -187 special auxiliaries listed at 62</i> <i>The surface condition may be denoted by</i>
-52	Automatically operated or controlled machines and processes	

621.7.015 (continued)	the —408 special auxiliaries listed at 62 →621.7.08 Measurement. Testing 621.753 Jig-making, toolmaking in general. Tolerances, limits, gauges etc	621.7.025.4 .6	In neutral or other types of bath Neutralizing <i>For neutralizing and rinsing in chemical finishing and surface treatment</i> →621.794.46
.016	Working conditions. Ambient influences (atmosphere etc)	.7	Rinsing
.2	Hot working <i>Temperature levels may be denoted by the —97 special auxiliaries listed at 66</i>	.027	Electrolytic cleaning, derusting etc →621.9.047.7 Electrolytic machining <i>Industrial applications of electrochemistry may be denoted by colon combination with the subdivisions of 621.357</i>
.3	Cold working <i>Temperature levels may be denoted by the —97 special auxiliaries listed at 66</i>	.029	Coating and other preparation for working or treatment →621.7.079 Accessory materials for working and treatment <i>Electrotechnical methods may be denoted by colon combination with the subdivisions of 621.357.7, and non-electrotechnical methods by colon combination with the subdivisions of 621.793/.795, e.g. 621.7.029:621.794.62</i>
.4	Dry working		Phosphating. Phosphatizing
.5	Wet working		
.6	Working in protective or reactive ambient media, in a controlled atmosphere 621.7.016.6 ≅ 621.78.06, e.g. 621.7.016.623 Working in a protective atmosphere		
.019	Faulty working : flaws, defects etc and their testing, e.g. 621.746.019 Faulty castings <i>Specific types of defect may be denoted by colon combination with the subdivisions of 620.19, e.g.</i> 621.7.019:620.191 Surface defects : roughness, pitting, discoloration :620.192 Internal defects : consistency, homogeneity, structure and volume changes :620.193 Corrosion. Resistance to attack, ageing, storage etc <i>Materials may be denoted by colon combination with the subdivisions of 669</i>	621.7.04	TREATMENT, WORKING AND FORMING TECHNIQUES <i>These special auxiliaries are not applicable to 621.78 or 621.791, where .04 has a different meaning</i> <i>Further .04 special auxiliaries are given under specific subdivisions of 621.7, e.g. 621.73, 621.74</i> <i>The shape of articles produced may be denoted by addition of the —4 special auxiliaries listed at 62</i>
621.7.02	PREPARATION, CLEANING AND COATING OF WORKPIECE FOR TREATMENT. PRETREATMENT →621.7.09 Aftertreatment, finishing etc 621.79 Welding. Bonding. Surface treatment. Finishing. Keeping, storing. Packing, packaging		Die forming, e.g. 621.73.043 Die forging 621.74.043 Die casting →621.7.073 Form-reproducing, pattern-reproducing appliances, dies and (permanent) moulds
.022	Dry cleaning, descaling by mechanical or physical means →621.7.023 Erosion or blast cleaning (sand, shot etc)	621.777	Extruding (strip and sectional material)
.2	Brush cleaning. Wiping. Rubbing down →621.924.8 Brush cleaning. Scratch, scaling brushes and machines	621.778	Drawing, working of rod, wire and similar sectional material
.4	Flame priming. Burning-off	621.983	Cold hammer and press (die) forming and stamping of sheet, strip and plate. Beating. Deep drawing. Embossing. Stretch forming
.6	Ultrasonic cleaning →621.9.048.6 Ultrasonic machining. Vibration machining	.044	High-energy-rate forming, e.g. explosion forming, electromagnetic forming or working, e.g. 621.787.044 High-energy-rate hardening 621.98.044 High-energy-rate forming of sheet, strip and plate
.023	Erosion or blast cleaning (sand, shot etc) →621.9.048.3 Mechanical (blast) erosion machining 621.924.9 Blasting. Sandblasting. Sandblast machines and equipment	.2	High-explosive forming and working
.1	Sandblast cleaning	.3	Expanding gas forming (with the gas as forming medium)
.3	Shotblast cleaning	.4	Hydro-spark forming (with water or other liquid as forming medium)
.024	Wet cleaning, washing and degreasing Spraying, sluicing, jetting with water etc Treatment with detergents, soap Treatment with solvents <i>Specific solvents may be denoted by colon combination with the subdivisions of 546/547</i>	.5	High-pressure forming (with plunger or other mechanical former)
.2	In alkaline bath	.7	Electromagnetic forming and working
.3	In acid bath	621.7.06	MACHINERY : ASSEMBLIES, MAIN COMPONENTS, AUXILIARY UNITS <i>These special auxiliaries are not applicable to 621.78, where .06 has a different meaning</i>
		.067	Transfer machines or units for handling stock between operations, e.g. 621.746.067 Casting transfer and handling plant <i>Transfer or handling machinery may be denoted by colon combination with the subdivisions of 621.86/.87</i> <i>For various handling, unloading devices</i> →62-229.7/.8

621.7.068	Holding or disposing machines and units (between operations). Coilers etc, e.g. 621.771.068 Coilers for rolling mills (strip, rod etc)	621.7.077 (continued)	accessory appliances, e.g. 621.73.077 Forge tongs, clamps, manipulators <i>Further particulars may be denoted by colon combination with the subdivisions of 621.881</i>
621.7.07	FORMING APPLIANCES, TOOLS AND ACCESSORIES. PATTERNS, DIES ETC →621.753 Jig-making and toolmaking in general. Tolerances, limits, gauges etc <i>Measurement and testing details (accuracy, contraction and machining allowances, taper etc) may be denoted by the .08 special auxiliaries</i>	.079	Accessory materials for working and treatment, e.g. lubricants, pastes, protective materials →621.7.029 Coating and other preparation for working or treatment
.072	Master copies, models. Templates. Patterns, pattern-making, e.g. 621.744.072 Moulding patterns 621.941.072 Copies, templates for lathe work	621.7.08	MEASUREMENT. TESTING <i>This special auxiliary is not applicable to 621.78, where .08 is used with a different meaning</i> <i>For toolmaking, tolerances etc</i> →621.753 <i>For production management and control</i> →658.5 <i>Further particulars may be denoted by colon combination with the subdivisions of 53.08, 531.7, 681, e.g.</i> 621.7.08:531.717 Measurement of thickness, diameter, height, length, distance etc
.073	Form-reproducing, pattern-reproducing appliances, dies and (permanent) moulds, e.g. 621.73.073 Forging dies 621.746.073 Permanent moulds for die casting 621.983.073 Cold sheet working and deep drawing dies	621.7.09	AFTERTREATMENT, FINISHING ETC →621.757 Fitting, assembling, mounting in general 621.79 Welding. Bonding. Surface treatment. Finishing. Keeping, storing. Packing, packaging, especially 621.797 Maintenance and repairs in general
.074	Ancillary forming appliances. Support and reinforcement formers etc, e.g. 621.73.074 Forging anvils, mandrels, formers, swage blocks etc 621.98.074 Sheet-working formers and blocks	.092	Aftertreatment 621.7.092 ≅ 621.7.02 →621.747 Aftertreatment: dressing, finishing, trimming, fettling etc
.075	Form tools for plastic working and finishing of workpieces, e.g. 621.744.075 Moulders' shaving and finishing tools 621.981.075 Sheet-bending tools (including machine tools)		
.077	Manipulating, gripping, securing and other		

Principal divisions

621.72	Pattern and die making. Permanent moulds [cancelled] →621.7.072/.073	621.73.041	Hand forging <i>But for blacksmiths' and artistic metalworking</i> →682, 739
621.73	FORGE WORK. FORGE LAYOUT AND EQUIPMENT. OPEN AND DIE FORGING →621.772 Boilermaking. Making of pressure vessels, reaction vessels etc 682 Smithery. Farriery. Hand-forged ironwork 739 Art metalwork. Metal objects which have been chiselled, cast, spun, hammered, forged or embossed	.042 .043 .045 .046 .047	Open (machine) forging, with hammer, press or roll Die forging <i>For dies</i> →621.73.073 Hammer forging <i>For hammers</i> →621.73.075, 621.972, 621.974 Press forging <i>For presses</i> →621.979 Roll forging <i>For rolls</i> →621.771.07 <i>For roll forging machines</i> →621.974.823
Special auxiliary subdivisions for 621.73		.06 .07 .073 .074 .075 .077 .079 .08 .09	Machines and ancillary plant →621.733 Forge equipment, hearths and furnaces Appliances and ancillary equipment for forging <i>Particularly applicable to 621.733</i> Dies Forging anvils, mandrels, formers, swage blocks etc Hammers and special forging tools Accessory appliances: tongs, clamps, manipulators Accessory materials: lubricants, pastes etc Measurement. Testing Aftertreatment. Cleaning, trimming, finishing etc of forgings
621.73.01	Principles, factors influencing forging		
.011	Forgeability. Flow of material, spread <i>Further particulars may be denoted by colon combination with the subdivisions of 539</i>		
.012	Working movement and its effects. Height of hammer drop		
.016	Temperature and other ambient conditions: hot working, cold working <i>Temperature levels may be denoted by the -97 special auxiliaries listed at 66</i>		
.019	Faulty forging, flaws and defects produced, e.g. overforging		
.02	Preparation of workpiece or stock for forging		
.04	Techniques, methods of forging <i>Particularly applicable to 621.735</i>		

Principal divisions (continued)

- 621.733 FORGE EQUIPMENT, HEARTHES AND FURNACES IN GENERAL
The .06/.07 special auxiliaries are particularly applicable here
Further particulars may be denoted by colon combination, e.g.
621.733:621.365 Electric forge furnaces
:66.04 Fuel furnaces (types, operation and accessories)
:662.6/.8 Specified fuels for forge furnaces
- 621.735 FORGING OPERATIONS AND TECHNIQUES
.2 Bending, straightening etc
.3 Operations altering the cross-section: upsetting, drawing etc
.32 Upsetting
.34 Drawing-down
.36 Flattening
.4 Forming shoulders
.5 Forming elbows, cranks etc
.6 Twisting
.7 Dishing. Flanging
→621.984.3 Shaping, dishing, flanging of boiler ends or heads
.8 Forge welding
For fusion welding and allied techniques
→621.791; the .052/.053 special auxiliaries given may be used here
.9 Other forging techniques
- 621.74 FOUNDRY WORK. FOUNDRY LAYOUT AND EQUIPMENT. MOULDING. CASTING
→669.16 Production of pig iron and ferro-alloys
Foundry siting, layout, power and service arrangements may be denoted by colon combination with the subdivision of 658.2
Moulding and casting of specific metals may be denoted by colon combination with the subdivisions of 669
- Special auxiliary subdivisions for 621.74**
- 621.74.01 Principles, factors influencing moulding and casting
.011 Castability. Mouldability. Pourability
Further particulars may be denoted by colon combination with the subdivisions of 539
.015 Surface finish
Further particulars may be denoted by the -187 and -408 special auxiliaries listed at 62
.019 Faulty working, moulding, melting, casting
→621.746.019 Faulty, defective casting. Flaws and their testing
.02 Preparation of stock for casting
.04 Techniques, special methods of foundry working and casting
.041 Sand casting in general
For sand/loam preparation, core-making and mould-making →621.742/.744
.042 Centrifugal casting
.043 Die casting
For permanent moulds →621.746.073
.1 Gravity die casting
.2 Pressure die casting (mechanical pressure)
.3 Pneumatic die casting (compressed gas)
.4 Explosion die casting
.045 Investment moulding and casting. Lost wax process (precision casting)
.046 Compound casting (in one or more than one metal)
.047 Continuous casting
→621.746.27 Arrangements for continuous production of castings

- 621.74.06 Machines, ancillary units and components
Further .06 subdivisions are given under 621.744.4
.07 Forming appliances and ancillary equipment. Patterns, form-tools etc
→621.744.07 Appliances, tools and accessories for mould-making
621.746.073 Permanent moulds, dies, shell moulds (for die casting)
.08 Measurement, testing in the foundry

Principal divisions (continued)

- 621.741 Kinds of foundry. Steel etc [cancelled] use 621.74 and colon combination
- 621.742 MOULDING SANDS, LOAMS, MIXES AND THEIR PREPARATION
For machines and equipment for treatment of moulding sands, loams etc →621.742.5.06
Machines and equipment for sand and loam preparation may be denoted by addition of the .06 special auxiliary
.4 **Materials, sands, loams etc: composition, properties, suitable mixes**
.42 Moulding sands: composition, properties, suitability etc
.422 Green sands
.424 Dry sands
.43 Loams: composition, properties, suitability etc
.433 Facing loams
.434 Backing loams
.44 Other moulding materials
.45 Fillers and special additions (other than binders and cements), e.g. blacking or coal dust, straw, hay, dung
→621.743.07 Appliances and accessories for core-making
621.744.07 Appliances, tools and accessories for mould-making
- .48 Binders. Cements
Manufacturing details may be denoted by colon combination with the subdivisions of 666.9
.486 Inorganic binders, e.g. clay, cement, plaster of Paris
.487 Organic binders, e.g. synthetic resins, dextrin, molasses, pectin
.5 **Treatment of moulding sands, loams etc**
Machines and equipment may be denoted by addition of the .06 special auxiliary
.52 Drying (by natural and artificial means)
Further particulars may be denoted by colon combination with the subdivisions of 66.047
.53 Milling. Crushing. Grinding
Further particulars may be denoted by colon combination with the subdivisions of 621.926
.532 Without preliminary drying
.533 After preliminary drying
.55 Treatment of old sands, e.g. magnetic iron separation
Further particulars may be denoted by colon combination with the subdivisions of 621.928.8
.56 Screening. Sizing. Sieving
Further particulars may be denoted by colon combination with the subdivisions of 621.928
.57 Mixing. Blending. Kneading
Further particulars may be denoted by colon combination with the subdivisions of 621.929
.59 Other special treatment
- 621.743 CORES. CORE-MAKING
→621.744 Moulding: patterns, moulds and mould-making

Special auxiliary subdivisions for 621.743

621.743.06	Machines and equipment for core-making
.07	Appliances and accessories for core-making
.073	Core boxes
.074	Core reinforcements : core irons, bars, barrels
.076	Straw rope and other foundation material
.079	Blacking and other protective materials

Principal divisions (continued)

621.743.4	Cores and (built-up) core materials <i>For sands, loams etc</i> → 621.742.4
.42	Plain (unreinforced) cores: material composition, properties
.422	Binders, agglomerants, <i>e.g.</i> resin, dextrin, linseed oil <i>For moulding binders</i> → 621.742.48
.45	Reinforced cores (with bars, barrels) <i>For core reinforcements</i> → 621.743.074
.49	Cores of special design or construction
.5	Operations : striking up, sweeping of cores
.52	In a core box <i>For core boxes</i> → 621.743.073
.53	With strickling or loam board
.54	Using core bars, barrels
.56	Drying and baking the core <i>Further particulars may be denoted by colon combination with the subdivisions of 66.047</i>

621.744	MOULDING: PATTERNS, MOULDS AND MOULD-MAKING → 621.742 Moulding sands, loams, mixes and their preparation 621.743 Cores. Core-making 621.746.073 Permanent moulds, dies, shell moulds (for die casting) 621.746.393 Ingot moulds
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Special auxiliary subdivisions for 621.744

621.744.07	Appliances, tools and accessories for mould-making → 621.744.3 Moulds (built-up moulds): enclosure, maintenance and renewal
.072	Patterns for foundry moulding : strickling gear, strickle boards <i>Construction details may be denoted by the -11 and -216 special auxiliaries listed at 62</i>
.2	Patterns for foundry moulding
.3	Strickling gear. Strickle boards
.074	Chills → 621.744.527 Core and chill insertion, securing etc 621.746.584 Chilling. Cooling – Casting
.075	Moulders' tools for shaping, smoothing etc <i>e.g.</i> hammers, sleekers
.077	Manipulating, lifting and other accessory moulders' appliances and kit, <i>e.g.</i> spikes, pins, plates, screws, sieves, dust bags
.079	Accessory materials, <i>e.g.</i> blacking, coating material

Principal divisions (continued)

621.744.3	Moulds (built-up moulds): enclosure, maintenance and renewal → 621.744.07 Appliances, tools and accessories for mould-making 621.744.5 Moulding operations and techniques, especially hand moulding 621.746.073 Permanent moulds, dies, shell moulds (for die casting) 621.746.393 Ingot moulds
.33	Flasks or moulding boxes (to enclose or hold the mould)

621.744.33 (continued)

.36	→ 621.744.54 Flask moulding. Box moulding
.361	Sand/loam maintenance in mould. Sand-damping. Sand-packing
.362	Sand-damping. Spray blowers etc Sand-packing. Rammers, tampers etc → 621.744.4.063 Sand-ramming, sand-packing mechanism
.37	Protective coating (and coating equipment). Mould painting etc
.38	Renewal of mould: remoulding, remoulding equipment
.4	Moulding machines and their operation. Machine moulding in general <i>For specific moulding operations (and relevant equipment)</i> → 621.744.5

Special auxiliary subdivisions for 621.744.4

621.744.4.06	Components. Mechanisms
.061	Presser plates. Packing plates
.062	Pattern plates. Strickle boards → 621.744.072.3 Strickling gear Strickle boards
.063	Sand-ramming, sand-packing mechanism → 621.744.362 Sand-packing. Rammers, tampers etc
.064	Pattern-drawing, pattern-lifting mechanism → 621.744.077 Manipulating, lifting and other accessory moulders' appliances and kit 621.744.526 Rapping and drawing the pattern
.065	Moulding table or platform
.066	Stripping device, plate or comb
.067	Transfer carriage. trolley

Principal divisions (continued)

621.744.42	Machines requiring hand lifting or hand drawing of patterns
.421	With vertical lift or draw in general
.422	With top lift (fixed pattern plate, with or without stripper)
.423	With bottom drawing (mobile pattern plate, with or without stripper)
.424	With vertical lift and rotating pattern plate
.1	With bottom drawing of flask after inversion
.2	With top lift of pattern-plate after inversion
.425	With bottom drawing of pattern, top lift of flask
.426	With lateral, inclined or skew draw or lift
.427	With lateral drawing by means of a screw
.428	With intermittent lateral drawing
.43	Machines with mechanical sand packing and mechanical lift or draw
.431	Jolt-ram or impact type
.432	Roller type
.44	Machines with packing plate (sand packing by presser). Squeezers
.442	With top lifting of flask
.443	With bottom drawing of flask
.444	With bottom drawing of pattern
.445	With top lifting of pattern after inversion
.45	Jolt-squeeze machines 621.744.45 ≅ 621.744.44
.46	Machines with double-ramming action (staple casting)
.462	Vertical staple casting
.463	Staple casting in stages
.47	Jolt-ram machines. Vibration machines
.48	Sand-slingers and other centrifugal machines
.49	Pressure moulding machines <i>The type of control may be denoted by the -5 special auxiliaries listed at 62, e.g.</i> 621.744.49–514 With manual control –52 With automatic control
.5	Moulding operations and techniques, especially hand moulding → 621.744.3 Moulds (built-up moulds)

621.744.5
(continued)621.744.4 Moulding machines and their
operation. Machine moulding
in general**Special auxiliary subdivisions for 621.744.5**

- 621.744.5.06 Use of machines and equipment for specific operations
- .07 Use of appliances, tools and accessories for specific operations
- .072.2 Use of patterns
- .3 Strickling. Use of strickle boards
- .077 Manipulating, lifting and other accessory appliances

Principal divisions (continued)

- 621.744.52 General operation: packing, drag and cope, core and chill insertion etc
- .521 Setting out the pattern. Powders used
- .4 Dusting the pattern. Powders used
- .522 Packing the drag
- .523 Clamping and inverting the flask
→621.744.33 Flasks or moulding boxes
- .524 Final preparations for packing the cope, e.g. sand joint
- .525 Packing the cope
- .526 Rapping and drawing the pattern
- .527 Core and chill insertion, securing etc
→621.743 Cores. Core-making
- .2 Inserting the cores and piping-off gases
- .3 Securing, supporting and wedging the cores, e.g. use of chaplets
- .5 Inserting the chills
- 7 Coating the moulds: use of graphite etc
→621.744.079 Accessory materials
621.744.37 Protective coating
- 528 Cutting the gates and runners
→621.746.3 Equipment for casting and pouring: tables, ladles, ingot moulds etc
621.746.4 Runners and gates. Risers. Shrinkage-heads or dead-heads
- .529 Closing the mould or flask
- .53 Open sand moulding
→669.163.1 Blastfurnace castings
- .535 With cores
→621.743 Cores. Core-making
- .54 Flask moulding. Box moulding
→621.744.33 Flasks or moulding boxes
- .541 In green sand (for wet casting)
- .542 In baked sand (for dry casting)
- .55 Bedding-in (with strickle board or loam board)
→621.744.072.3 Strickling gear. Strickle boards
- .551 In green sand (for wet casting)
- .552 In baked sand (for dry casting)
- .553 In loam
- .56 Shell moulding
The type of binder may be denoted by colon combination with the subdivisions of 621.742.48
- .58 Drying the mould
→621.743.56 Drying and baking the core
Particulars of drying processes may be denoted by colon combination with the subdivisions of 66.047
- 621.745 MELTING: FURNACES, MATERIALS USED, PROCEDURES, PROCESSES

Special auxiliary subdivisions for 621.745

- 621.745.01 Principles, factors influencing melting. Defects etc
- .012 Efficiency, economy etc
621.745.012 ≅ 66.012

Principal divisions (continued)621.745.3 **Furnaces: main types, operation and control, maintenance etc**

→621.745.56 Molten metal or melt: tapping, melting (fusion) temperatures, yield

Further particulars may be denoted by colon combination with the subdivisions of 66.04 or 662.9, e.g.

- 621.745.3:66.041 Furnace design, mode of operation (continuous, batch etc)
- :66.042 Furnace ancillary equipment. Charging devices, air supply etc
- :66.043 Furnace materials, linings
- :662.9 Combustion, draught, temperature control, firing etc

Special auxiliary subdivisions for 621.745.3

- 621.745.3.07 Appliances for servicing and charging the furnace
- .078 Breakers and other implements for use on the charge
→621.926 Crushing, grinding, pulverizing, especially of hard materials
622.7 Mineral dressing. Preparation of ores and coal
66.042.2 Charge handling and distributing devices

Principal divisions (continued)

- 621.745.31 Preheating installations and equipment
- .32 Crucible furnaces. Pot furnaces
For electric furnaces and heating apparatus
→621.365
- .321 Crucible furnaces, pot furnaces in general
- .323 Single-crucible furnaces
- .324 Multi-crucible furnaces
- .325 Tilting furnaces
- .326 Rotary furnaces. Rocking furnaces
- .1 Rotary furnaces
- .4 Rocking furnaces
- .33 Reverberatory (flame) furnaces, recuperative or regenerative types
- .331 Early types, without chimney
- .332 Modern types, with chimney
- .1 'Siegerländer' or German-type furnaces
- .2 American-type furnaces
- .24 With forced draught
- .3 English-type furnaces
- .4 Camel-back furnaces
- .6 Reverberatory furnaces with gas or coal firing
- .335 Recuperative or regenerative (Siemens-Martin) furnaces
- .1 With regenerative firing
- .3 With recuperative firing
- .34 Shaft furnaces. Cupola furnaces
- .341 Elbow furnaces
- .342 Without air blast, small or normal size
- .1 Boiler furnaces. Ladle furnaces
- .2 Tipping furnaces
- .4 Wilkins furnaces, fixed or portable
- .343 With air blast, small or normal size
- .1 Small cupola furnaces
- .11 Fixed
- .12 Portable
- .2 Cupola furnaces of normal size
- .21 Without forehearth
- .22 With forehearth
- .222 With unheated forehearth
- .224 With heated forehearth
- .23 With nozzles all in one plane
- .24 With nozzles in various planes

- 621.745.343.27 With spark chamber
 .271 Open-type
 .272 Closed-type
 .273 Spark chamber with injection of water
 .29 Special types of construction
 .292 Suction cupola furnaces
 .35 Electric furnaces
Class here only foundry melting aspects
For electrical engineering aspects of electric furnaces→621.365
 .36 Small converters. Other types of foundry melting furnace
Details of mobility may be denoted by the –182 special auxiliaries listed at 62, e.g. 621.745.36–182.2 Fixed
 .3 Transportable
 .37 Installations for duplex processes in foundry work
 .4 **Materials and additions used in foundry melting**
 .43 Ingot or bar metal including alloying materials
Specific metals may be denoted by colon combination with the subdivisions of 669
 .435 Additions
Specific metals may be denoted by colon combination with the subdivisions of 669
 .44 Scrap metal. Turnings etc
 .45 Fluxes. Clinker. Slag etc
 .451 Basic fluxes, e.g. limestone
 .452 Acidic fluxes, e.g. fluorspar
 .456 Clinker. Slag. Scoria
 .5 **Melting procedure, processes and products**
Specific metals may be denoted by colon combination with the subdivision of 669, e.g. 621.745.5:669.71 Melting of aluminium
The temperature or temperature range may be denoted by the –97 special auxiliaries listed at 66

Special auxiliary subdivisions for 621.745.5

- 621.745.5.01 Principles, influencing factors, meltability, rate of melting etc
 621.745.5.01 $\cong$ 621.78.01

Principal divisions (continued)

- 621.745.55 Melting process: effect of slags, sulphur (in fuels), etc
 →66.046.5 Fusion. Melting. Smelting
 .551 General effects of slags, scoria, sulphur etc. Desulphurization
 .552/.557 Melting processes in particular types of furnace
 621.745.552/.557 $\cong$ 621.745.32/.37, e.g. 621.745.552 Melting process in crucible furnaces, pot furnaces
 .56 Molten metal or melt: tapping, melting (fusion) temperatures, yield etc
For details of pouring→621.746.51
 .57 Furnace (flue or stack) gases and their composition
 .58 Slags: chemical composition, proportion of total yield etc

621.746 CASTING: TRANSFERRING AND POURING THE MOLTEN METAL**Special auxiliary subdivisions for 621.746**

- 621.746.01 Principles, influencing factors, conditions etc
 621.746.01 $\cong$ 621.7.01, e.g.
 621.746.019 Faulty, defective casting. Flaws and their testing
 .04 Special techniques of casting and pouring
 .043 Die casting
 .047 Continuous casting
 →621.746.27 Arrangements for continuous production of castings

- 621.746.07 Appliances and accessories for forming castings
 .073 Permanent moulds, dies, shell moulds
 →621.744.3 Moulds (built-up moulds)
 621.746.043 Die casting
 621.746.393 Ingot moulds

Principal divisions (continued)

- 621.746.2 **General arrangements for casting, transfer of molten metal etc**
 .21 Casting pits
 .22 Arrangements for transfer of molten metal to moulds. Batch casting
 .221 Carrying by hand
 .222 Transfer by trucks or trolleys
 .223 Transfer by aerial ropeways or cableways, telfers etc
The form of transport may be denoted by colon combination with the subdivisions of 625.5
 .224 Transfer by cranes, overhead travellers etc
The type of crane may be denoted by colon combination with the subdivisions of 621.87
 .24 Arrangements for bringing the moulds to the ladles. Series casting
 .242 On trucks, trolleys
 .243 On revolving tables
 .244 By conveyor
The type of conveyor may be denoted by colon combination with the subdivisions of 621.867
 .27 Arrangements for continuous production of castings
For continuous casting→621.74.047, 621.746.047
 .3 **Equipment for casting and pouring: tables, ladles, ingot moulds etc**
 →621.744.3 Moulds (built-up moulds)
 621.746.073 Permanent moulds, dies, shell moulds
 .31 Tables. Casting tables
 .32 Ladles
 .322 Hand ladles
 .323 Travelling ladles: trolley ladles, crane ladles
 →621.746.22 Arrangements for transfer of molten metal to moulds. Batch casting
 .324 Drum ladles
 .328 Plug ladles, separating ladles and similar types
 .3 Plug ladles
 .5 Separating ladles (with partitions)
 .329 Lining, drying, firing and other matters
Further particulars may be denoted by colon combination with the subdivisions of 66.04 or 662.9
 .33 Slag, scoria ladles and trolleys
 .34 Pouring basin. Pouring feed
 →621.744.528 Cutting the gates and runners
 .344 With bottom plug
 .345 With tank feed (pocket-shaped)
 .346 Special types, e.g. with skimming, dividing, decanting devices
 .39 Ingot moulds. Other casting and pouring equipment
 →621.746.073 Permanent moulds, dies, shell moulds
 .393 Ingot moulds: dimensions, capacity etc
Sizes of moulds may be denoted by the –181 special auxiliaries, shapes by the –4 special auxiliaries, and methods of cooling by the –71 special auxiliaries, all listed at 62
 .395 Group plates. Funnel tubes. Channel bricks etc
 →621.746.42 Runners and gates
 .2 Group plates
 .4 Funnel tubes
 .6 Channel bricks

621.746.4	Runners and gates. Risers. Shrinkage-heads or dead heads	621.747.077	Manipulating appliances. Clamps etc <i>Further particulars may be denoted by colon combination with the subdivisions of 621.881</i>
.42	Runners and gates		
.423	Runner-hole or runner-gate (down-gate, drop-gate, pouring-gate)	.078	Accessory appliances. Core stoppers etc
.424	In-gate or sprue (horn-gate, spray-gate, spinner-gate)		
.43	Plugs, pins and other gate closures, stoppers	Principal divisions (continued)	
.46	Risers. Shrinkage-heads or dead-heads	621.747.5	Operations of separating, dressing, finishing and repairing castings
.461	Air holes. Gas vents	.51	Stripping the castings. Separating from moulds
.462	Risers	.52	Dressing-off. Trimming. Fettling. Removal of runners, risers and cores
.464	Shrinkage-heads. Dead-heads. Discard-heads	.53	Sand removal : preliminary cleaning-off, brushing, wiping etc
.5	Pouring operations, skimming, filtering etc. Methods of obtaining sounder castings	.54	Cleaning, polishing. Grinding-off projections. Peeling etc
.51	General considerations : temperatures, methods of introducing molten metal	.541	With hand-held tools (chisels, hammers etc) <i>The type of tool may be denoted by colon combination with the subdivisions of 621.9</i>
.512	Temperatures <i>Further particulars may be denoted by the -97 special auxiliaries listed at 66</i>	.542	Mechanically in drums or tumblers
.513	Rate of pouring	.543	Grinding (with stick, wheel etc) <i>Further particulars may be denoted by colon combination with the subdivisions of 621.92</i>
.514	Pouring time		
.55	Methods of pouring. Staple casting etc.	.545	Peeling the ingot or casting
.552	Top pouring (direct, from above)	.55	Sandblasting <i>Further particulars may be denoted by colon combination with the subdivisions of 621.924.9</i>
.553	Side pouring (through several superimposed passages)		
.554	Bottom pouring (from below)	.56	Chemical cleaning, pickling etc <i>Further particulars may be denoted by colon combination with the subdivisions of 621.794</i>
.555	Arcuate, horn, tangential pouring		
.556	Staple casting	.57	Burning-off, blazing-off (decarbonizing). Desurfacing →621.791.94 Thermal cutting
.558	Pouring with stirring	.58	Repairing damaged castings
.56	Removal of slag and oxides. Skimming, filtering etc <i>Further particulars may be denoted by colon combination with the subdivisions of 66.067/.068</i>	.581	Cementing together
.58	Methods of obtaining sounder castings	.582	Inserting (extra) pieces
.582	Direct pressure <i>For types of press</i> →621.979	.583	Welding (cold, warm or hot) <i>Further particulars may be denoted by colon combination with the subdivisions of 621.791</i>
.583	Using compressed gas or partial vacuum <i>The pressure or pressure range may be denoted by the -98 special auxiliaries listed at 66</i>	.584	Injection or spraying (Schoop etc) <i>Further particulars may be denoted by colon combination with the subdivisions of 621.793.7</i>
.584	Chilling. Cooling →621.744.074 Chills	.59	Other aftertreatment operations on castings Toolmaking. Gauging. Assembling [cancelled] → 621.751, 621.753, 621.757
.585	Electrical methods	621.751	MARKING, LAYING-OUT OF WORK →621.7.08 Measurement. Testing. 744 Linear and geometric drawing
.586	Heating the riser		
.587	Heating the mould	621.753	JIG-MAKING, TOOL-MAKING IN GENERAL. TOLERANCES, LIMITS, GAUGES ETC <i>Jigs and form tools for specific processes may be denoted by adding the .07 and .08 special auxiliaries listed at 621.7 to the relevant 621.7 and 621.9 main numbers</i>
.588	Mechanical means : shaking, jolting etc		
.589	Other methods	.1	Tolerances. Working allowances
.6	Solidifying. Standing time. Cooling	.2	Limits and fits
.62	Solidifying →536.421.4 Transformation liquids to solids. Solidification. Freezing. Freezing point	.3	Gauges, gauge-making in general <i>Further particulars may be denoted by colon combination with the subdivisions of 53.08 and 531.7</i>
.628	Solidifying processes		
.4	Solidifying time, speed	.4	Jigs, jig-making in general →note under 621.753
.64	Standing time	.5	Tools, tool-making in general →note under 621.753
.66	Cooling. Cooling pits	.755	Finishing in general [cancelled] →621.7.09, 621.795
		.756	Bench fitting (and assembly) work [cancelled] →621.7.09, 621.757
621.747	AFTERTREATMENT: DRESSING, FINISHING, TRIMMING, FETTLING ETC	621.757	FITTING, ASSEMBLING, MOUNTING IN GENERAL <i>For aftertreatment and finishing</i> →621.7.09
Special auxiliary subdivisions for 621.747		621.762	POWDER METALLURGY →661.6 Various non-metals and their compounds
621.747.015	Resultant surface condition and finish		
.02	Preparation and cleaning techniques 621.747.02≈621.7.02 →621.79 Welding. Bonding. Surface treatment. Finishing. Keeping, storing. Packing, packaging		
.06	Machinery and equipment for finishing in general		
.07	Appliances and accessories for dressing and finishing castings		
.075	Finishing tools. Trimmers etc <i>Further particulars may be denoted by colon combination with the subdivisions of 621.9</i>		