DACUM Research Chart for Plastics Engineer

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Duties	Tasks					
A **Define Product Requirements**	A-1 Establish customer requirements 3.1 3.2	A-2 Perform benchmarking analysis 2.7 3.5	A-3 Investigate field data 2.9 3.0	A-4 Determine design features & functionality 3.3 4.1	A-5 Determine manufacturing alternatives 2.8 4.0	A-6 Determine material alternatives 2.8 3.9
B **Participate in Project Planning Process**	B-1 Develop project timing 2.8 2.9	B-2 Assess manufacturing capabilities 2.8 3.4	B-3 Assess manufacturing capacity 2.1 2.6	B-4 Identify technological uncertainties 3.1 3.9	B-5 Evaluate manufacturing alternatives 2.9 3.7	B-6 Evaluate material alternatives 3.1 3.8
C **Engineer The Product**	C-1 Create & design model in detail 2.7 3.8	C-2 Create bill of materials & tools 3.3 3.0	C-3 Perform CAE/FEA processes 2.9 4.0	C-4 Produce geometric dimensioning & tolerancing (GDT) 3.2 3.7	C-5 Identify key product characteristics 3.3 3.6	C-6 Develop prototype 2.7 3.3
D **Facilitate the Tool Build Process**	D-1 Requisition materials 2.8 2.4	D-2 Release program build information 2.8 2.9	D-3 Coordinate with program team 3.4 3.0	D-4 Evaluate the tool build progress 3.0 3.2	D-5 Resolve tool build issues 2.8 3.9	D-6 Coordinate product changes 3.3 3.6
E **Validate the Product**	E-1 Evaluate performance test results 3.3 3.8	E-2 Perform dimensional certification 3.0 3.1	E-3 Evaluate product aesthetics 2.8 2.9	E-4 Verify product capability 3.2 3.5	E-5 Resolve product validation issues 3.2 3.8	E-6 Obtain customer approvals 2.9 2.9
F **Coordinate Resources (Human & Financial)**	F-1 Participate in performance review 2.4 2.9	F-2 Justify need for human resources 1.7 2.5	F-3 Justify need for capital resources (e.g., software, equipment) 2.1 2.9		F-4 Coordinate sourcing & supply 2.0 2.6	F-5 Coordinate logistical arrangements 1.9 2.2
G **Maintain Customer Relations**	G-1 Satisfy diverse customer requirements 3.1 3.6	G-2 Maintain effective customer communication 3.7 3.8				
H **Support Post Launch Activity**	H-1 Implement corrective action 2.9 3.5	H-2 Support continuous improvement 3.4 3.5	H-3 Implement cost reduction strategies 2.8 3.4	H-4 Implement customer engineering changes 3.4 3.2	H-5 Provide field support 3.3 2.7	H-6 Report on things gone right/things gone wrong (TGR-TGW) 3.3 2.8

B-7 Define resources (e.g., technology, human materials) 2.3 3.5	B-8 Identify sourcing requirements 2.5 2.8			
C-7 Identify unique intellectual property 1.8 3.6	C-8 Patrice-pate in design reviews 3.5 3.0	C-9 Make customer presentations 3.1 3.5	C-10 Develop a manufacturing process flow 3.1 3.5	C-11 Apply advance quality planning process 3.1 3.4
D-7 Respond to sampling trial issues 3.2 3.7				

F-6 Monitor spending in relation to budget 2.3 2.5	F-7 Resolve budget issues 2.0 2.5	F-8 Prepare project progress report for customer 3.4 3.2	F-9 Prepare internal project progress reports 3.4 3.0

COMPARATIVE ANALYSIS
Plastics industry professionals were asked two questions during the Plastics Engineer task verification.

1. Is this task expected of a **beginning worker**?
2. How **difficult** is it to learn to perform this task?

An average rating for each section was obtained using a 1-5 scale.

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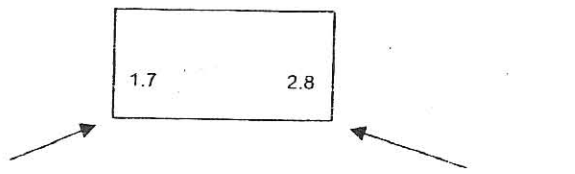

Acronyms

GDT = Geometric, Dimensioning & Tolerancing
CRM = Customer Relationship Management
CAE = Computer Assisted Engineering
FEA = Finite Element Analysis
PLM = Product Lifecycle Management
TGR = Things Gone Right
TGW = Things Gone Wrong
NAFTA = North American Free Trade Agreement
DMU= Dynamic Modeling Unit

General Knowledge and Skills

Quality tools – how they work
Functional quality planning systems
Computer literacy (foundational)
Communication skills – public speaking
Physics, chemistry, science
Organizational skills
Model product using CAD software
Math – algebra, basic calculus
Advanced integration
Problem solving
Conflict resolution
Negotiation
Program management
Leadership
Computer programming,
Computer system design
Electrical circuits, materials
Ability to select materials
Mechanics of assembly technology
Assembly join technology
Methods of attaching plastics
Applied manufacturing processes
Business knowledge practices
Moldmaking manufacturing practice
Prototyping technology
Heat treating metallurgy
Environmental assessment principles
Vector calculus
Differential equations
Finite math (statistics)
Quantitative
Basic engineering
Polymers
CAE skills
Time management
Product design
Tool design
GDT
Customer service
Machine design
Manufacturing processes
Error/mistake proofing
Report writing
Technical writing
Engineering
Economic principles
Business ethics
Design drafting
Multi tasking skills
Dynamics
ISO standards
Mechanical materials
Plastics processing

Worker Behaviors

Honest
Integrity
Sincere
Outgoing, positive, self-motivated
Assertive, non confrontational
Self-assured, confident, team player, role model
Willing to do what it takes to get the job done
Good listener
Inspired
Flexible
Professional
Sense of humour
Goal oriented
Creative
Emotionally stable

Tools, Equipment, Supplies and Materials

Lifting rings
Eye bolts, chains
Re-grinder
Electrical items
CAE tools, CAD systems
MOLDFLOW Software
PLM software
Mold clamps
Bolts, slings
Robots (part removal)
Vibrational welding
Sonic
CRM software
Customer's relationship
Injection moulding machine
Gravametric blender
Thermalator
Gas assist
Pneumatic System and tooling
Metrology equipment
Testing equipment – Tensile Environmental chamber
Ventilators (support lab testing)
FDM finite definition molding
Scale (gram)
Conveyor – angle shute (to create manufacturing cell)
Machine design manufacturing processes
Error/mistake proofing
Dryer (material)
Cooler (chiller)
Tower water system
Intellimold system
DMU Software (dynamic modeling)
Overhead crane

Future Trends and Concerns

Further consolidation of the supply chain
Short lead-time
Larger requirements – cheaper, faster, better
Environmental/recycling/alternative materials
Full service supplier
Thinner parts – less plastics
Developing new materials, new technologies
New processes
Global marketplace
Internet applications
Sourcing foreign supplies
Refining automation – assembly
Replacing metals with plastic
Increased customer requirements
Increased quality requirements tightened
Commodities to system supply
OEM location decisions impacted by government
KYOTO, NAFTA, government regulations
Fuel issues, hybrid vehicles
Fuel consumption increasing,
Lighter vehicles for greater mileage vs smaller engines
New electronics human interface with vehicle eg. voice control, navigational systems
Shortage of skilled workers