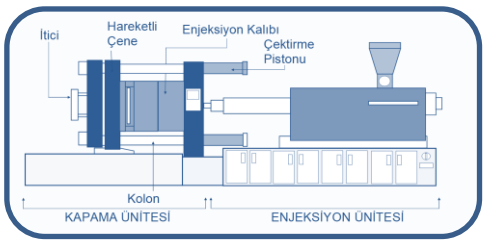
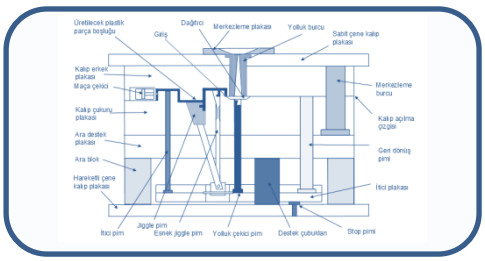


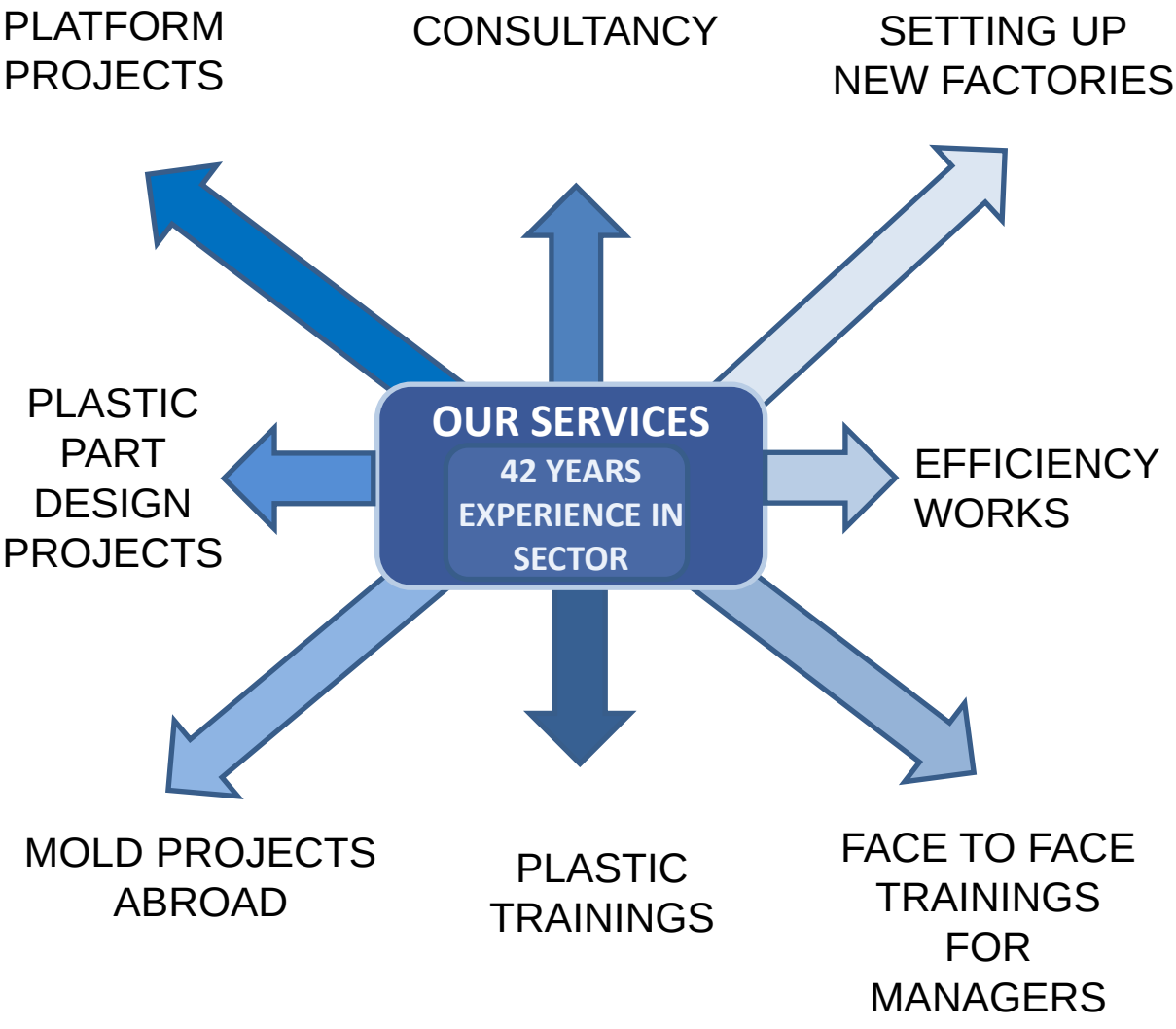

METİN BİLGİLİ PLASTIC TRAINING&CONSULTANCY

42 YEARS EXPERIMENT IN PLASTIC SECTOR



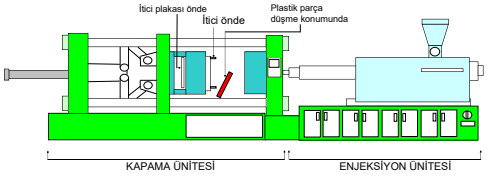


OUR SERVICES



ENGLISH PLASTIC TRAININGS

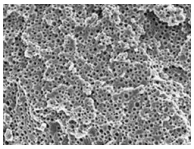
1 INJECTION TECHNOLOGIES&TROUBLE SHOOTING
2 ADVANCE INJECTION TECHNOLOGIES
3 MATERIAL SELECTION&EFFECTS ON THE DESIGN AND PROCESS
4 PART DESIGN FOR PLASTIC INJECTIONS
5 PLASTIC INJECTION MOLD DESIGN
6 PLASTIC PART STAMPING AND DECORATION METHODS
7 PERCEPTIONAL QUALITY AND QUALITY CONTROL FOR PLASTIC PARTS
8 MANAGEMENT FOR EFFICIENT PLASTIC FACTORY
9 EXRUSION&THERMOFORMING

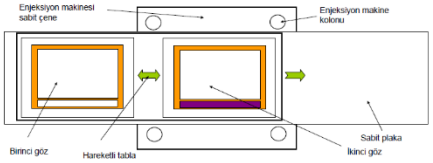


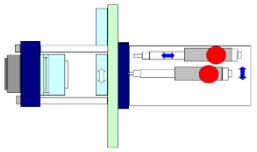
BASIC INJECTION TECHNOLOGIES

1	Technologies
	Thermoplastic injection
	Multi material injection
	Multi colour injection
	Insert molding
	Gas injection
	Water injection
	In mold labelling
	In mold decoration
	Cascade injection
	Steam injection
	Mucell
2	Plastic materials
	Material types
	Thermolpastics and thermosets
	Hierarchy of plstics
	PE,PP,PMMA,POM,PA,PS,ABS details and using areas
3	Mold
	Mold types
	Mold equipments
4	Injection process
	Plastic materials and rheology
	Injectıon parameters
	Mold,process,material,part,thermal,time,pressure,speed,quality
	Clamping force calculations
	Injection phase and effected parameters
	Injection screw
	Injection stroke
	Material quantity calculation
	Thermal specifications
	Relation with injection and material
	VPT velocity to pressure transfer
	Ejection phase and effectred parameters
	Shrinkage
	Part weight and screw diameter relation
	Pressure necessity according to plastic types
	Cooling system

5	Process parameters for polyprophylene
6	Process parameters for polyamide
7	Porcess parameters for polycarbonate
8	Steps for mold dissasembly
9	Steps for mold fixing
10	Putting into operation procedure for injection mold
11	Injection machines
12	Material drying
13	Colouring
14	Hot runner
15	Mold maintenance
16	Cleaning of machine barrel
17	Injection molding machine maintenance(column,barrel,screw)
18	Mold sweating
19	General process,part,mold problems
20	Specific plastic injected part quality problems Flash Welding line Sink marks Gloss Weight fluctiation Short shot Warping Breaking Flow lines Mold can not be opened Diesel effect Matte rounds around of gate areas Peeling Colour changing Ejection problems Roping Black spects Bubble Dimensional problems Matte problems Texture problems Fingering effects on surface Cushionning problems Uncommon smell Long cycle time







ADVANCED INJECTION MOLDING

1	Scientific injection Scientific injection with engineering approach Scientific injection molder Scientific problem solving methodologies Quesions to define problem Systematic approach to peroblems Documentation to solve problems Work on samples with problems Correction od datas Equipments for scientific approach Examining scientific problems Process window Process variables and relatiıons in between Problem solving methodologies Problems in the production facilities.
2	Decoupled injection Scientific approach to filling,compression,holding phases VPT point examining Clamping plate stretching identification on VPT point 6 Sigma approach to problems
3	INDUSTRY 4.0 IIOT and scientific injection applications MES applications EUROMAP 63,77
4	How cycle time reduced? Dry cycle Auxiliary equipments Plastic material based cycle time reduction Part thickness related cycle time reduction Ejection based cycle time reduction Cooling based cycle time reduction Mold based cycle time reduction Cycle time reduction with additive manufacturing
5	Cost reduction Part design based cost reduction Mold design based cost reduction Quality based cost reduction Production based cost reduction
6	How to purchase right and effective injection molding machine?

7	Process parameters adjustment with engineering approach for PC
8	Material drying Dessicant dryer Dew point Humidity leves according to plasitc materials
9	Colouring Carrier Pigment Dozing
10	Advanced Process Methodologies Multi injection production systems GIT,WIT injection applications and design criterias Heat&Cool H&C+GIT H&C+ EGIT E-Mold Heating with high pressure water EMCO Heating with Infrared MUCELL Insert molding Overmolding In mold labelling Silicon injection Joinmelt (In mold assemblying) IBM BMC IMC CLEARMELT SKINMELT REVERSE CUBE EXJECTION Touchskın
	Scientific approach to problems with 5M1P methodology(with samples)





CHOOSING OF PLASTIC MATERIAL&EFFECT ON DESIGNAND PROCESS

1	*Born of plastic*
2	*Plastic materials&Production methologies*
3	*Plastic types*
4	*Hierarchy of thermoplastic type*
5	*Thermost plastics*
6	*PU*
7	*EPS*
8	*Different application*
9	*Expectatios from plastics*
10	*Things for waiting of plastics*
11	*Material types and product requirement*
12	*Specifications of general plastic types*
13	*Anistropy-Glass Transition*
14	*Modulus of elasticity-Yield point-Elongation at break-Residual stress-Tensile strenght*
15	*Creep-Creep rupture-Creep modulus*
16	*Viscosity-Shear rate-Coefficent thermal expansion-Abbe value*
	Design expectations from plastic material
17	*Long&short time under pressure*
18	*Under load axial or different direction.*
19	*Water absorbsion ratio*
20	*Impact specifications unde hot and cold conditions.*
21	*Breaking specifications under pressure.*
22	*Wear specifications*
23	*Colour changing against heat.*
24	*Burning behaviours*
25	*UV Resistance*
26	*Chemical resistance*
27	*Migration*
28	*Ultrasonic weldability*
29	*Sticking specification*
30	*Nucleating agent*
31	*Flow path factor*
32	*Clamping force according to pla*
33	*Long and short time temperature resistance.*
34	*Dimensional changing as tempe*
35	*Electric resistance.*

36	Dimensional shrinkage
37	Contact with foods
38	Coating specification
39	Gloss specifications
40	Importancy of part thickness
41	Campus
42	Composit materials for metal replacement
43	Termoplastik elastomerler ve sorunları.
	Katkı Maddeleri
44	Antioxidant-Light stabiliser-Lubricants
45	Antifogging-Antistatic
45	Flame retardants
46	Blowing agents
47	Colorant
48	Filler&Reinforcement
49	Nucleating agent
50	Antiblocking
51	Antimikrobik ajan
53	Bio plastics
54	Is the plastic materials dangereous?
55	Recycling
56	Simple tests to know plastic types with applications
	Material choosing according to process
57	Gas injection
58	Thinwall
59	H&C
60	Double injection
61	Ultrasonic welding
62	Laser welding
	Tests to apply plastics
63	MFI-MFR-MVR-VİSCOSITY
64	Izod,charpy impact-DTUL-Vicat-Falling dart
65	Flexural strenght
66	UL Flammability - Glow wire
67	Pencil hardness
68	Arc resistance-Dielectric strenght-Volumetric strenght-Surface resistivity-Hot wire ignition
69	Bend strip

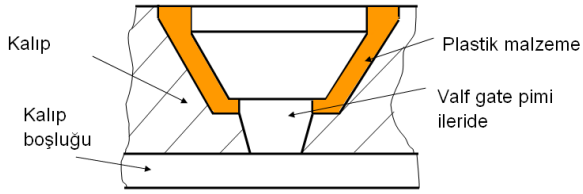



PLASTIC PART DESIGN

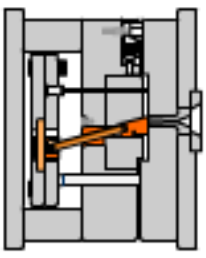
1	Process of design steps
2	Enter to design,priorexamination,basic design criterias.
3	General expectations from design.Part function,material effects.
4	Benchmark
5	Production process choosing.
6	Hidden cost factors
7	20 Steps for good quality plastic part design. Informations on the part drawing. Tolerance Gloss Effects of part design on the Mold design (Mold type,sttel qualıty,etc.)
8	Design criterias. Draft angles Gate position and type Shrinkage factors Nominal thickness,thickness differences,ribs. Parting line Slides,jiggles. Surface quality standarts Radius,hole design. Gate design(side,tunnel,banana, etc.)
9	Assembly technics (Screw,snap fitting,sticking,ultrasonic,laser)
10	DFMEA - PFMEA
11	Part design and effects on process,production. Yearly production number,using for one product number. Exsisting similar part comparing,post processes,assembly.
12	Part design effect on mold design and machine selection. Tie bar distance,tonaj,nozzle,ejector,jiggle,
13	Design for gas injection.
14	Design for glass encapsulating
15	Design for H&C
16	Mold acceptance tests and effects on part design
17	Design effects on assembly
18	Design effects on packaging.
19	Informations in project book
20	60 Proven design examination
21	Design examination of company existing part design samples.
22	Applications for informations on the part drawing.

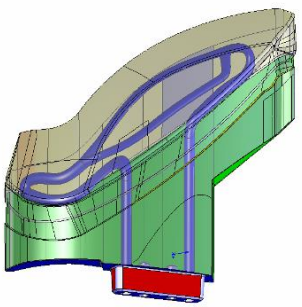
PLASTİK PARÇA KALIP TASARIM EĞİTİMİ

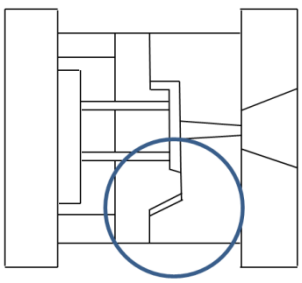
1	Mold design process steps
2	Quality plastic product steps
3	Enter to design,preliminary design pre examination.
4	Design examination at 8 steps.
5	Hidden cost factors
6	Mold life and related criterias.
7	Mold design criterias. Plastic material and effects on mold design sriterias. Injection machine and effects on mold design criterias. Plastic part tolerances and relation with shrinkage ratio. Mold dimension desicion according to shrinkage ratio. Mold insertr and dimensions to the edge of the mold. Side wall bending. Ejector plate dimensions. Safe dimensions for mold insert. Mold parting line. Support blocks. Sprue bushing. Centering pin. Jiggle Slide cooling. Gate location. Eye bolts. Insulatıon plate. Mold running efficiency. Gate number Plate thickness. Air gaps
8	Mold process steps
9	Production numbers.
10	Moldability.
11	Part productionnumbers and effects on part design.
12	Machine chosing according to part design.
13	Tolerance expectations.
14	Mold flof analysis sample examination
15	Mold types(Standart,2 plate,3 plate,stripper plate,with slide,screw molds,collapsible core,stack,rack&pinion,gas injection,water injection,e-mold,DTI,E-mold,DTI,3 D Weldless,tandem,clearmelt,IBM,ICM,Cube,family molds.)
16	Surface definition
17	Polishing standarts,SPI-ISO,stone,sandpaper,diamond paste,choosing,polishing steps,polishing defects and solutions.
18	Steel choosing.
19	Gate types,cold and hot runners,gate location and effects on pressure and design.
20	(Yolluk giriş,yan giriş,tünel yolluk,muz yolluk,yüksük,disk,3 plakalı yolluk sistemi,



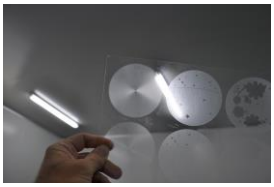
21	Sprue puller types.
22	Hot runner types,manifold choosing.
23	Runner system balance,runner section,choosing and effect on efficiency.
24	Cold slug well.
25	Cooling system,cooling time calculations,reynold number,scientific cooling,conformal cooling.
26	Cooling analysis examination.
27	Ejection system.
28	In mold air evacuation system.
29	Mold cost analysis.
30	Progress report
31	Mold acceptance test.
32	Mold ordering process steps. Part drawing informations. Mold quotation request form preparing. Mold maker choosing Evaluation of mold quotation. Avaliable mold maker choosing according to qualifying. Contract. Preliminary design examination. Final drawing examination First shot Mold acceptance works. Mold transportation.
33	Mold design samples and problem solutions.
34	Mold maintenance.
35	Texture
36	Company mold drawings examination,examation on parts.





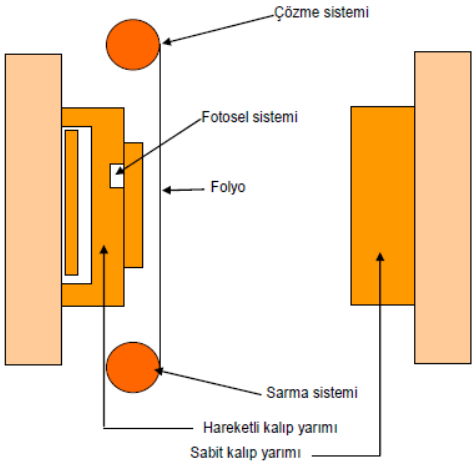


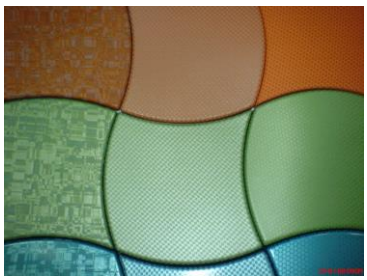


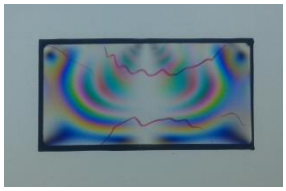


PLASTIC PART STAMPING AND DECORATION METHODS

1 General view to decoration methods.
2 Expectations from the decoration methods
3 Criterias for decoration.
4 Hidden cost factors
5 Decoration methods and abbreviations.
6 Painting and stamping methods.
7 Silk printing.
8 Pad printing.
9 Printing with foil.
10 Foil types.
11 Foil production technics.
12 Hot stamping Up&Down.
13 Hot stamping Rolling.
14 3 D Hot Stamping.
15 Silicon molds.
16 2 D IMD
17 2 D design principles.
18 3 D IMD.
19 3 D IMD quality tests.
20 Cubic printing.
21 Laser Printing
22 Polylic.
23 Brand protection.
24 Metal IMD.
25 Quality control methods for decoration.
26 Logos.
27 Examinatios on samples.





PERCEPTIONAL QUALITY AND QUALITY CONTROL FOR PLASTIC PARTS

1 Description for perceptional quality and quality.
2 Customer perception.
3 Perceptional quality improving works.
- Related with Process
- Related with Mold
- Related with Design
- Related with Decoration methods
- Related with Raw material
- Related with Quality control

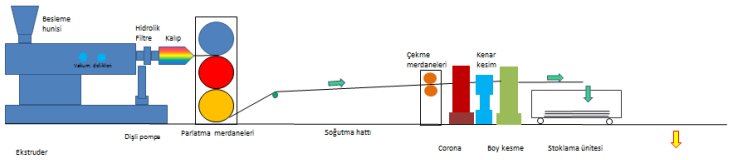
4 Sufficiency for quality parts
- Sufficiency for process
- Sufficiency for machine
- Sufficiency for mold construction
- Sufficiency for quality control equipments
- Sufficiency for post processes
- Sufficiency for operator
- Sufficiency for knowledge

5 Quality steps for quality parts
6 Six Sigma approach to quality
7 Tolerance and effects on quality
8 Geometrical tolerances
9 Test methods for quality control

Dimensional-chemical-mechanic-density-fusion-burning-form-humidity internal stresses-perceptional-visual-geometrical-thermal-morfological.
Recognition:Floating-burning-sniffing-breaking-section-stracthing-chemical
Thermal tests:FTIR-DMA-DSC-TGA-DTA-SEM-DTUL-ETÜV-MVR-MFI-BP TMA-MSDC
Electrical tests:SR-IP-HMT-DS-CTI-DC-LOI-IT-AR-VR
Mechanic tests:Pull-fatigue-impact-surface hardness-hardnesss-wear
Visual and optic tests:Ra-haze-internal stresses-colour-gloss
Burning tests:HB.V-2.V-1.V-0.5VA.5VB-GLOW WIRE.
Tests for decoration methods:Adhesive-humiditywearing-hardness-ball-chemical
Other tests:ESCR-water absobstion-sun test-bend strip-FDI-ash-viscosity-life-3 D-laser.

MANAGEMENT FOR EFFICIENT PLASTIC FACTORY

1 Vision,mission,main values.
2 Organisation
3 Targets
4 Performance management
5 Presentations
6 Budget
7 Safety
8 Staff
9 Inventory for machines,lay-out,infrastructure.
10 Costs
11 Inventory for hot runners
12 Scraps
13 Projects
14 TPM
15 Meetings
16 Satisfaction
17 Shifts,Overworks
18 Internal trainings
19 External trainings
20 Census,stock control
21 Long term plans
22 Pocess audits
23 Forms
24 Production plannings
25 Maintenance
26 Quality
27 Efficiency
28 Raw material stock level
29 İnternal audits
30 Subsupplier audits.



EXRUSION&THERMOFORMING

Extrusion

1 Plastic process methods

2 Extrusion process methods

Sheet extrusion	Corrugated pipes extrusion
Profile extrusion	Cable extrusion
Multicolor extrusion	Blown film extrusion
Multimaterial extrusion	Blown part extrusion

3 Materil selection for extrusion process

4 Extrusion dies

5 Sheet extrusion and details of stations on the line

6 Troubleshooting for sheet extrusion

Black spots	Orange effect
Die lines	Orientation
Gloss	Pollution
Dimensional changes	Lumps
Lines	Transversal lines
Colour	Irregular sides
Pit	Curling

7 Raw material

8 6 steps for quality sheet

9 Sheet test methods

Thermoforming

1 Thermoforming process

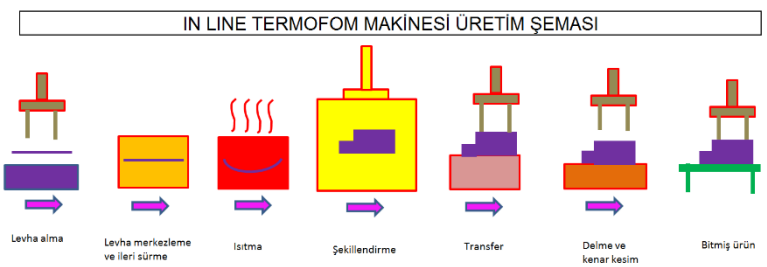
2 Thermoforming machines

- Single stat
- Two stations
- Three stations
- Four stations
- In-line
- Twin sheet

3 Heating syatems

4 Positive presure

5 Trouble shooting



EPS PROCESS

1	Molding types
2	Material choosing
3	Process steps
4	Pre expansion.
5	Aging
6	Block production.
7	Mold design
8	EPS material,chemical strenght,flame retardancy,coloring.
9	EPS part design criterias.
10	Cushion calculations.
11	EPS heat conductivity
12	EPS production process parameters.
13	Fusion.
14	Problem solvings.
15	Safety
16	EPS quality tests

PAINTING

1	Hand panting
2	Automated painting
3	Silver paint
4	Packaging.
5	Transport

COMPOSITE TECHNOLOGİES

1	Composite production types.
2	Composite materials.
3	Composite materials and advantages,disa
4	Hand laying.
5	Spraying.
6	RTM
7	HP-RTM
8	T-RTM
9	C-RTM

BLOW MOLDING	
Blow molding molds	
Blow molding types(extrusion,injection)	
Battery type.	
Exstusion blow.	
Plastic materials using on blow molding process	
Regring effects on process.	
Continious and discontinious extrusion blow molding	
Divergent and convergent mold head.	
Extrusion blow molding problem solutions.	
	Thickness differences.
	Wrinkle
	Irregular sag on parison
	Transversal rings
	Hole on parison.
	Pinch off problems
	Parison elongation.
	Elongation at neck section.
	Ovality at neck section.Boyun kısmında ovallik
	Closing at neck section.
	Mold related part defects.
	Mold related volumetric shrinkage.
	Defects on screw section.
	Visibility problems.
	Wavy effects on surface.
	Swelling sections on the wall.Duvarda şişen kısımlar
	Cold zones.
	String effects
	Weak welding at mold opening line

Metin Bilgili

Metin Bilgili was borned in Eskişehir on 1957 city located center of the Turkey.Primary School and Technical High School education was in Eskişehir.
He has a bursary from World Bank in 1997 for Technical Education and he was in Manchester Polytechnic about Plastic Technology in Dalton Faculty also in Wigan Tech for CNC-CAD education.
He has worked as a trainee in ,Mazak,Deckel,Leyland and some mold makers in Manchester during his education period.
He has started to work İn Arçelik House Hold Appliance Factory as a Process Engineer in 1998 than worked as a Team Leader for Plastic Factory in Refrigerator Plant,than moved to the TV Plant of Arçelik as a Production Manager of Plastic,painting,EPS production divisions,and Technical Leader in the Production Technologies Directoriate division.
He is married and has two sun's 32 and 26 years old.and also has grandsun 8 years old.

Certificates
Six sigma 'Black Belt'
TPM
Total Quality Management
Time Management
Incoe Molding Systems
Analysıs for problem and desicion
Management according to targets
Management Skills Development Programme
Grid for managers
Finance for managers

Memeberships
PAGEV
Society of Plastic Engineers

Speechs
PAGEV Plastic Industry Congress 2007 ‘’New injection technologies’’
Yalova University ‘’Life without plastic’’2008
ODTÜ ‘’Bussiness Life’’2008
Mold exibition conference ‘’Whitegoods sector’’ 2008
Engel opening ceremony 2009
Yalova University ‘Polimer Seminar’’2011
Sakarya University ‘’Change is future’’2011
Yalova Üniversity ‘’Polimer Days’’ 2012
PAGEV ‘Prosess Seminar’’2014
Yıldız Teknik University ‘’National Plastic Technologies Symposium’’2015
PAGEV Plastic Congress ‘’Electrical housware and plastic in consumer electronics’’ 2015

Published Writings in Technical Magazines

PAGEV Plastic Magazines

Troubleshootings and solving methods in injection sector
Choosing of the plastic injection machine.
Plastic production and finishing methods
Analysis for Turkish Injection Molders
Analysıs for Turkish Plastic Part Producers
Process for plastic sector and design
Today and future for plastic production Technologies.
Using the words in right way and using the right words in plastic sector.
Plastic Dictionary

We are plastic producers Magazine
Systemathic approach to quality problems in plastic injection process.

Plastic Turkey Magazine

Last injection,mold and plastic material Technologies.

Projects

Efficiency projects
Quality improvement projects
TPM projects
Six Sigma projects
Scrap ratio decreasing projects for injection.extrusion and thermoforming
Machine investments
Mold investments
Establishing new factory
Platform product projects

METİN BİLGİLİ EĞİTİM DANIŞMANLIK

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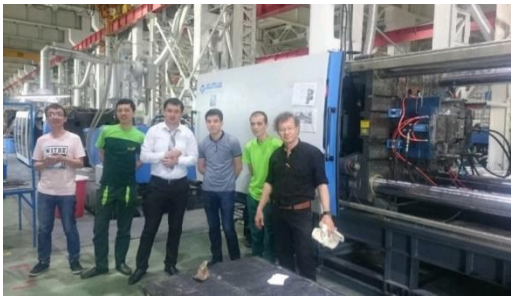
METİN BİLGİLİ EĞİTİM DANIŞMANLIK

TOFAŞ APPLICATION TR.

TOFAŞ PHOTO.

İLERİ GROUP GAS INJ.



5 S WORKS

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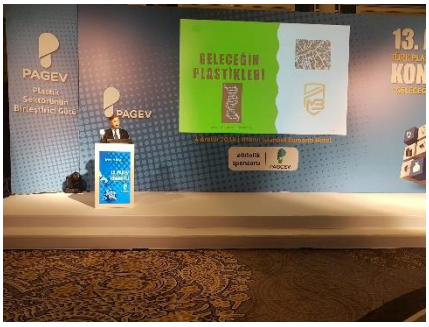

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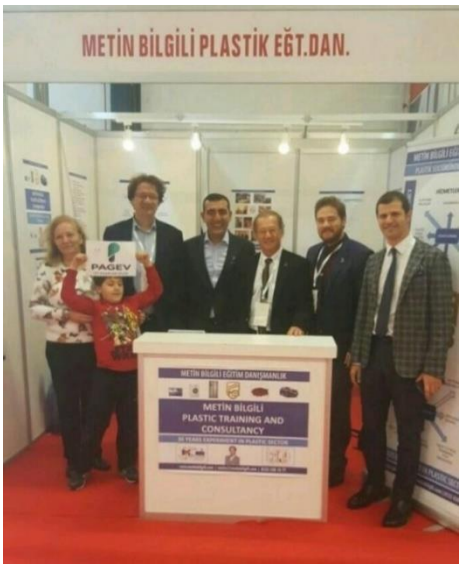

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