The Checklist is to summarise relevant data for assessing whether and how **MoMAS**® is to be installed

Mail or fax to:

MoMAS® Team
Dr.- Ing. M. Pandit

Casimirring 108
67663 Kaiserslautern

email: pandit@momas.de

MoMAS® - Modular Measurement and Automation System for Extruders

- **Check List** (Information to be provided by the extruder crew) –

I Extruder, Furnace, Puller

Project: ………………………….

Firm: ………………………….

Plant: …………………………   **Date**:………………………

Product types …………………………….

No. of shifts / per week ………..   **Annual tonnage** …………

No. of extrusions per die change …………………………. (typical)

Extruder: Manufacturer and year of installation……………………

Type:	direct / indirect	Extrusion force:	……………. tonnes
Stroke:		Max. duration of period of force at limit	…………. % of stroke
Alloy:		Hydraulic control/actuation:	………………..
Block length:	……….. mm	Control electronics:	Relay / PLC Type: …….
Block-Ø:	……….. mm	Velocity control:	Yes / no
Extrusion time / billet	……….. s (typical)	Idle time between extrusion cycles	……….. s (typical)

Variable which is controlled and which the operator sets as input	*Ram / profile speed* ……………………	*Oil flow* ………	*Valve position* ………

Billet furnace:

Type: Gas / Oil/ Induction

Taper heating: yes / no   No. of zones …………………………….

Puller: Details of puller and control of puller motion: ………………………………..

……………………………………………………………………………………………………

II Process variables and sensors

Sensors available and sensor signals which can be tapped at PLC:

Variable	Sensor installed: yes / no; Sensor type	Signal at PLC
Extrusion speed (Ram velocity)		
Ram position		
Profile exit temperature		
Hydraulic pressure		
Billet temperature		
Container temperature		

III Programmable Logic Control (PLC)

Make, Type and Date of installation of PLC   ....

....

OPC available ☐ yes   ☐ no

Availability of links between PC – PLC   (e.g. ETHERNET) …………………
Provision to access process parameters and batch data from PLC   ☐ yes   ☐ no

IV Data Base (if in use) ……………………………………………………………………………

Process and production data which are / are to be measured, acquired, evaluated, archived and retrieved

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....
....

V Targeted advantage to be achieved with MoMAS

Productivity ☐   **Quality control** ☐   **Production robustness** ☐
Other   …………………………………………………………………………..

Contact person for PLC:

Name…………………………………….   Designation/Position …………………………

Tel. No. ……………………………………. Telefax……………………………………..

 Email…………………………………….

It is not seldom that a company acquires an automation system, and the operators use it for a few weeks or months but gradually revert to the old scheme of things, i.e. operate the extruder manually. This is unsatisfactory and should be pre-empted.
It is advisable to take a look at the following points before deciding whether to install an automation system or not.

Operating standards

Commercial viability

- Goal to be achieved with MoMAS

- a) Increase productivity …. b) improve product quality…. c) process reliability/ reproducibility …. d) Provide database facility…. e) Process visualisation   f)………………

- Is the extruder plant working at its full capacity ? Degree of capacity ……………………… %

- Is there a demand for increased product output? Envisaged increase   ……………………%

- Is a new market sector being envisaged?   Envisaged market …………………………………..

- Is a customer to be catered to, who asks for proof of the ranges of process parameters which have been adhered to during production?
  Desired process parameter checks   ………………………….

Technical feasibility

- Are the hydraulics and ram position / speed control adequate? …………………………
  Details of hydraulic aggregate ……………………………………………………………
  ……………………………………………………………………………………..……

- Check whether the actual ram speed follows changes of the changes of the set point of ram speed control loop. Observed control error …………………… % (approx.)

- Is the billet furnace temperature control in order?
  For a constant reference input to the billet temperature control, the billets coming out of the furnace should have the same temperature after the steady state has been reached. The transition after a reference input change should be less than 2 or 3 billets.
  No. of billets till measured temp. is equal to set-point   …………………………….

- Is the puller control adequate? Puller speed follows changes of ram speed ... yes / no

- Is the PLC capable of handling the data traffic to the PC? This is a vital requirement. MoMAS PC receives measurement data during extrusion and the process data and the measured billet temperature between 2 cycles from the PLC . It transmits the optimised data (reference inputs for the billet temperature control and ram speed) to the PLC also during idle times between two cycles.
  For this, 100 sets of 10 integer variables should be sent from PLC to Industrial PC during extrusion of a billet.
  Does the PLC have enough reserve ……………………………………….. yes / no

Expertise of and acceptance by the crew

MoMAS depicts an open system whose functions can be integrated into the overall working of the plant data processing system to gain maximum advantage. In order to exploit the capabilities fully, technicians capable of programming the PLC and configure the data transfer and PLC set-up to operate in concert with the plant data base would be very useful.

Is such expertise available? …………………………. yes / no

- MoMAS helps operate the extruder under prescribed conditions and fully exploit limits of the press. To exercise this possibility, the expertise of a process engineer would be useful. He could prescribe the limits and evaluate the data acquired and supplied by MoMAS to find the optimal parameters and limits.
  Are the services of such a process engineer available, who can specify the extrusion parameters / ranges/ limits of extrusion parameters to the operators and interact with the process? …………………………….   yes / no

- Enthusiasm of the operating crew

  The success of any system which is added to the extruder depends upon the will of the operator to make it work and his competence. Is the crew capable of operating a new system and does it have the spirit to exploit the capabilities of the new system.

  Would operators have difficulty to watch both temperature and speed instead of concentrating only on the speed? …………… yes / no

Contact person for project:

Name..   Designation / Position …………………………….

Tel. No. ……………………………………..   Telefax…………………………………………….
Email…………………………………………..

Date…………………………….   Signature……………………………………….