

Description	Raw materials
A. Structural shell 28 sections. Each section made in two steps: 1) pre-moulding cassettes of fibreglass and polyurethane-foam (17 cassettes x 28 sections = 476 cassettes/station) 2) assembling the cassettes and moulding skins	
A.1. Pre-moulding cassettes (17 pcs. total per section)	
- 2 x 450 g fibreglass reinforcement cassettes 5 pcs./section per pc. (140 pcs./28-section station)	Resin Cretic 196/1 1,8 kg Mat MK-12 2,5 kg Glossell 2,5 kg
- 1 x 450 g fibreglass reinforcement cassettes 10 pcs./section per pc. (280 pcs./28-section station)	Resin Cretic 196/1 1,8 kg Mat MK-12 2,5 kg Glossell 2,5 kg
- 2 x 450 g fibreglass reinforcement cassettes (triangular cassette) (28 pcs./28-section station)	Resin Cretic 196/1 1,8 kg Mat MK-12 2,5 kg Glossell 2,5 kg
- 1 x 450 g fibreglass reinforcement cassettes (triangular cassette) (28 pcs./28-section station)	Resin Cretic 196/1 1,8 kg Mat MK-12 2,5 kg

Raw material	Labour (h)	Total per station		Comments
		material	labour	
				All labour costs based on hand-lay up and hand-mixed foaming.
				<u>Raw materials:</u>
				x Accelerator and catalyst included in calculation price
				xx Accessories like wax, release agents and acetone included in factory price
				Total labour for 476 cassettes 3.072 h divided with average labour-cost per mk 7,48 = 434 h
				Re-division actual labour with production machine - press and better handling in actual production as follows:
				- mould prepair 200 h
				- fibreglass moulding hand-lay up or spraying 200 h
				alt. press moulding 70 h
				- foam filling 50 h
				- release and edge cutting 100 h
				<u>alt. 1:</u> total 45 min with hand-lay up
				<u>alt. 2:</u> total 33 min with press moulding
				Total labour costs in production:
				alt. 1: 45 x 476 = 398 h
				alt. 2: 33 x 476 = 288 h
		9.384	434 h	

Description	Raw materials	a price detail	a price detail		Total per station	Comments
			material	labour		
A.2. Laminating skins on sections, assembly of cassettes and finishing work (28 pcs./station)	Resin Crystic 19C/T 160 kg	2,15				Most work spent on fitting cassettes together, as well as waiting for first spray-up to gel.  By using vacuum bag and spraying inner skin separately on flat surface working time can be reduced by appr. 50%.  Envision in full production appr. 350 h
	Fibreglass MK-12 450 g/m <sup>2</sup> 15 "	4,58				
	Rowing 60 "	3,50				
	Rowing mat 600 g/m <sup>2</sup> 17 "	4,35				
	Gelcoat GE 1100 16 "	4,62				
A.3. Channels for inside joint covers different small items - channels 35 pcs	as above					
A.4. Repairs, drilling and finishing	-					
A.5. Painting inside (material used at factory and on site)	Joker 329/69 196 kg	3,28				
Total factory costs for one CF 200 station						

Description	Raw material	Labour (h)	Total per station		Comments
			material	labour	
A.2. Laminating skins on sections, assembly of cassettes and finishing work (28 pcs./station)	350,00	Piece-work			26 h/section total 728 h
	70,00	Fmk 265 per section			
	211,00	= appr. 26 h per section			
	73,00				
	782,00		21,920		
A.3. Channels for inside joint covers different small items - channels 35 pcs	970,55	(actual) 35 h	970	35 h	
A.4. Repairs, drilling and finishing	-	104 h	-	104 h	
A.5. Painting inside (material used at factory and on site)	522,00	125 h	622	125 h	Hand-painting with spray-painting reduced by appr. 2/3. In full production appr. 60 h.
Total factory costs for one CF 200 station			32.896	1426 h	

Evaluation of above-said in full-scale production

1. Labour
- A.1. By using cold press moulding and a froth-machine for foam labour can be reduced to appr. 362 h
- A.2. By better tolerances and vacuum bag system in mould system appr. 350 h
- A.4.+5. Spray-painting and better control total labour by above-said appr. 150 h  
762 h

2. Materials
- A.1. Foam and resin can be reduced by appr. 20% with envisioned methods and equipment.
- A.2. Shell-thickness calculated on weight excluding flanges appr. 1/8" which is over-dimensioned. Reduction on appr. 20% possible.
- A.4. 196 kg of paint, seem to be some losses, unaccounted for.  
Envision after above-said: 32.896 ./ 20% = 26.316 or appr. 6.300 US \$ for 28-section station.

It must also be kept in mind that 12 sections are made with full taper properties (the overhanging sections).  
These sections should be made with a corrugated member between the skins instead of foam-cassettes.