

## LAMPIRAN

### Lampiran 1.1 Data Casting yang Mengalami *Breakout*

Tanggal	No. Charge	Steel Grade	Vc	Mold		Roll Appron	Strand	Usia Mold	TLL	Temp SH TD					TD. Mekanisim	MD Powder	MD. Powder LOT	TD. Car	Tundish	Reject Molten LD	Reject Molten TD
				No. W/j	No. Mold					TD 1	TD 2	TD 3	TD 4	TD 5							
09-Sep-21	17186	SMNB3H-1	1,2				1														
05-Oct-21	17671	S10C		6	38	11	1	305	1516	73	80	74	73		1	LCP-503S		1	11	-	-
20-Oct-21	17940	SMNB3H-1	1,2	5	39	14	2	310	1498	60	67	61	55	45	2	CNS-15N	M10503	2	12	-	4500
21-Oct-21	17958	SMNB3H-1		6	38	4	2	323	1498	61	80	76	66	60	30	CNS-15N	M10503	2	14	-	-
02-Nov-21	18182	SUP9A		7	40	8	1	492	1477	70	83	88	88			CNS-15N	M10504	2	12	-	-
04-Nov-21	18202	S33CVT	1	4	36	14	1	512	1497	88	68	54	43		5	CNS-15N	M10504	1	14	-	7500
04-Nov-21	18201	S10C	1,1	4	36	14	1	511	1516	49	76	72	64	56		LCP-503S		2	13	-	3000
10-Nov-21	18309	SMNB3H-1	0,8	5	39	11	4	694	1498	25	67	62	58	56	5	CNS-15N	M10833	2	11	-	2600
11-Nov-21	18339	SMNB3H-1	1,4	6	38		1	442	1498	39	33	38	35	33	1	CNS-15N	M10502	2	14	9000	13700
27-Nov-21	18612	SUP9	0,9	4	41	8	2	303	1481	52	52	46	45	44	5	CNS-15N	M10501	2	15	-	-
01-Dec-21	18665	SUP11AM	1,0	6	38		1	534	1480	26	39	45	50	47	1	CNS-15N	M10501	1	10	-	-
01-Dec-21	18667	SUP11AM	1,45	5	42	4	2	53	1480	19	56	73	73	78	1	CNS-15N	M10501	1	10	-	4800
11-Dec-21	18854	SMNB3H-1	0,8	6	43	11	2	188	1498	42	52	55	51	47	2	CNS-15N	M10501	1	10	-	-
11-Dec-21	18855	SMNB3H-1	1,5	4	41	10	1	492	1498	24	50	51	48	40	2	CNS-15N	M10501	1	10	6000	13300
12-Jan-22	19382	SUP11A	0,95	7	44	11	1	105	1478	44	56	60	59	56	5	CNS-15N	M10834	1	10	-	-
12-Jan-22	19383	SUP11A	1,4	6	43	10	2	461	1478	33					5	CNS-15N	M10834	1	10	-	13800
25-Jan-22	19614	SUP11AM	1,35	5	42	14	2	369	1480	37	106				1		M10834	1	10	-	13700
25-Jan-22	19614	SUP9	1,0	7	44	4	1	308	1481	64	76	65	56	45	30	CNS-15N	M10834	1	11	-	8700
30-Jan-22	19691	SUP9H	0,6	4	45	11	1	109	1481	87	77	64	54	44	2	CNS-15N	M10834	1	15	-	-
25-Feb-22	19988	SUP11AM	1	5	42	10	2	609	1480	59	49	45	38	33	2	CNS-15N	M10835	1	13	-	2900
06-Mar-22	20146	SUP9	1	7	44	10	1	267	1481	80	82	84			1	CNS-15N	M10834	2	10	-	-
16-Mar-22	20358	SVD48S1	0,8	4	45	8	2	479		96	80	66			2	CNS-15N		2	14	-	8000
16-Apr-22	20922	SMNB3H-1	1,3	4	47	14	2	67	1498	38	68	76	70		1	CNS-15N	M11615	1	12	-	2000

No Unit CH	No CH	Kode Produk	Grade	MD Level		TLL	Vd end	LD start	Temp TD						Temp TD (SH)						Vc (m/min)	45 Min	MD Powder		Feeder MD Powder		MD					
				1st	2nd				TD1	TD2	TD3	TD4	TD5	TD6	5T	TD1	TD2	TD3	TD4	TD5			TD6	5Min	45 Min	1st	2st	1st	2st	1st	2nd	1st
1	17169	44448	SMNB3H-1	5	5	1498	1643	1610	1563	1562	1558	1549	1542				65	64	60	51	44		1	0.9	CNS-15N	CNS-15N	12	11	1620	1620	6	6
2	17170	44448	SMNB3H-1	5	5	1498	1642	1623	1592	1592	1579						94	94	81				0.6	1	CNS-15N	CNS-15N	24	24	1620	1620	6	6
3	17171	44448	SMNB3H-1	5	5	1498	1651	1628	1522	1533	1560	1544	1548				24	35	62	46	50		0.9	1	CNS-15N	CNS-15N	15	15	1620	1620	6	6
4	17172	44448	SMNB3H-1	5	5	1498	1644	1617	1539	1557	1560	1557	1549				41	39	62	59	51		1	1.1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
5	17173	44448	SMNB3H-1	5	5	1498	1645	1629	1544	1549	1552	1550	1553				46	51	54	52	55		1.1	1.1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
6	17174	44448	SMNB3H-1	5	5	1498	1645	1620	1546	1561	1565	1559					48	63	67	61			1.1	1.1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
7	17175	44448	SMNB3H-1	5	5	1498	1637	1616	1539	1561	1566	1563					41	63	68	65			1.1	1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
8	17176	44448	SMNB3H-1	5	5	1498	1635	1611	1550	1562	1557	1549					52	64	59	51			1	1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
9	17177	44448	SMNB3H-1	5	5	1498	1650	1625	1541	1561	1560	1560					43	63	62	62			1	1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
10	17178	44448	SMNB3H-1	-20	-20	1498	1639	1610	1532	1555	1556	1554	1548				34	57	58	56	50		1	1	CNS-15N	CNS-15N	19	19	1620	1620	6	6
11	17179	44448	SMNB3H-1	-20	-20	1498	1645	1620	1534	1552	1555	1551					36	54	57	53			1	0.9	CNS-15N	CNS-15N	18	18	1620	1620	6	6
12	17180	44448	SMNB3H-1	-20	-20	1498	1650	1620	1531	1550	1544	1550	1544				33	52	46	52	46		0.8	0.8	CNS-15N	CNS-15N	18	18	1620	1620	6	6
13	17181	44448	SMNB3H-1	-20	-20	1498	1655	1638	1519	1548	1559	1562	1564				21	50	61	64	66		0.8	0.8	CNS-15N	CNS-15N	18	18	1620	1620	6	6
14	17182	44448	SMNB3H-1	-20	-20	1498	1650	1628	1568	1568	1565	1564	1561				70	65	67	66	63		0.8	0.8	CNS-15N	CNS-15N	17	17	1620	1620	6	6
15	17183	44448	SMNB3H-1	-20	-20	1498	1645	1616	1542	1553	1550	1545	1539				44	55	52	47	41		0.9	1	CNS-15N	CNS-15N	17	17	1620	1620	6	6
16	17184	44448	SMNB3H-1	-20	-20	1498	1652	1620	1523	1552	1554	1555					25	54	56	57			1	1	CNS-15N	CNS-15N	17	17	1620	1620	6	6
17	17185	44448	SMNB3H-1	-20	-20	1498	1652	1621	1538	1552	1551	1551					40	54	53	53			1	1	CNS-15N	CNS-15N	17	17	1620	1620	6	6
18	17186	44448	SMNB3H-1	-20	-20	1498	1649	1624	1541	1572	1588	1572	1498				43	74	70	74			1.2	1.3	CNS-15N	CNS-15N	18	18	1620	1620	6	6
1	17366	44489	SMNB3H-1	5	5	1498	1654	1626	1546	1557	1559	1550	1540				48	59	61	52	42		0.9	0.9	CNS-15N	CNS-15N	14	16	1620	1620	6	6
2	17937	44489	SMNB3H-1	5	5	1498	1657	1622	1580	1564	1567						82	66	69				0.6	1	CNS-15N	CNS-15N	24	24	1620	1620	6	6
3	17938	44489	SMNB3H-1	5	5	1498	1661	1636	1536	1568	1567	1561	1555				38	70	69	63	57		0.8	0.8	CNS-15N	CNS-15N	14	14	1620	1620	6	6
4	17939	44489	SMNB3H-1	5	5	1498	1660	1634	1535	1542	1532	1554	1548				37	44	54	56	50		0.7	1	CNS-15N	CNS-15N	14	14	1620	1620	6	6
5	17940	44489	SMNB3H-1	5	5	1498	1650	1623	1538	1565	1559	1553	1543				60	67	61	55	45		1	1.5	CNS-15N	CNS-15N	14	14	1620	1620	6	6

1	17941	44489	SNMB3H-1	5	5	1498	1660	1648	1548	1581	1581	1581				50	83	83	83				1	1	CNS-15N	CNS-15N	24	24	1620	1620	6	6
2	17942	44489	SNMB3H-1	5	5	1498	1656	1620	1580	1573	1588					82	75	70					0.6	1	CNS-15N	CNS-15N	14	14	1620	1620	6	6
3	17943	44489	SNMB3H-1	5	5	1498	1655	1631	1567	1581	1575	1565	1555			69	83	77	67	57			1	1	CNS-15N	CNS-15N	12	14	1620	1620	6	6
4	17944	44489	SNMB3H-1	5	5	1498	1648	1620	1533	1558	1561	1558	1498			55	60	63	60				1	1	CNS-15N	CNS-15N	12	14	1620	1620	6	6
5	17945	44489	SNMB3H-1	5	5	1498	1653	1629	1550	1559	1561	1557	1548			52	61	63	59	50			0.8	0.8	CNS-15N	CNS-15N	12	13	1620	1620	6	6
6	17946	44489	SNMB3H-1	5	5	1498	1648	1628	1519	1559	1554	1543				21	61	56	45				0.8	0.8	CNS-15N	CNS-15N	12	13	1620	1620	6	6
7	17947	44489	SNMB3H-1	5	5	1498	1665	1646	1535	1567	1565	1568	1563			37	69	67	70	65			0.8	0.9	CNS-15N	CNS-15N	11	11	1620	1620	6	6
8	17948	44489	SNMB3H-1	5	5	1498	1660	1624	1545	1558	1561	1558				47	60	63	60				1	1.1	CNS-15N	CNS-15N	12	13	1620	1620	6	6
9	17949	44490	SNMB3H-1	5	5	1498	1664	1624	1540	1566	1562	1551	1557			42	38	64	53	59			0.8	0.8	CNS-15N	CNS-15N	10	11	1620	1620	6	6
10	17950	44490	SNMB3H-1	-15	-15	1498	1655	1618	1541	1553	1543	1550	1543			43	55	45	52	45			0.8	0.9	CNS-15N	CNS-15N	12	13	1620	1620	6	6
11	17951	44490	SNMB3H-1	-15	-15	1498	1662	1638	1530	1563	1567	1567	1559			32	65	69	69	61			0.9	0.9	CNS-15N	CNS-15N	12	13	1620	1620	6	6
12	17952	44490	SNMB3H-1	-15	-15	1498	1645	1615	1545	1547	1544	1541	1536			47	49	46	43	38			0.8	1	CNS-15N	CNS-15N	12	13	1620	1620	6	6
13	17953	44490	SNMB3H-1	-15	-15	1498	1658	1621	1543	1559	1568	1562	1559			45	61	70	64	61			0.9	0.9	CNS-15N	CNS-15N	13	15	1620	1620	6	6
14	17954	44490	SNMB3H-1	-15	-15	1498	1666	1624	1548	1565	1565	1563	1560			50	67	67	65	62			0.8	0.8	CNS-15N	CNS-15N	13	14	1620	1620	6	6
15	17955	44490	SNMB3H-1	-15	-15	1498	1667	1648	1542	1575	1575	1568	1572			44	77	77	70	74			0.8	0.9	CNS-15N	CNS-15N	13	14	1620	1620	6	6
16	17956	44490	SNMB3H-1	-15	-15	1498	1661	1629	1557	1568	1571	1563	1559			59	70	73	65	61			1	1.1	CNS-15N	CNS-15N	12	14	1620	1620	6	6
17	17957	44490	SNMB3H-1	-15	-15	1498	1659	1637	1556	1568	1576	1576				58	70	78	78				1.1	1.1	CNS-15N	CNS-15N	12	14	1620	1620	6	6
18	17958	44490	SNMB3H-1	-15	-15	1498	1650	1614	1559	1578	1574	1564	1558			61	80	76	66	60			1.1	1.4	CNS-15N	CNS-15N	12	14	1620	1620	6	6
1	18303	44509	SNMB3H-1	5	5	1498	1653	1621	1590	1581	1581					92	83	83				0.7	1	CNS-15N	CNS-15N	24	24	1620	1620	6	6	
2	18304	44509	SNMB3H-1	5	5	1498	1652	1617	1567	1568	1568	1553	1546			69	70	70	55	48			0.8	0.8	CNS-15N	CNS-15N	15	16	1620	1620	6	6
3	18305	44509	SNMB3H-1	5	5	1498	1646	1618	1539	1555	1551	1547	1544			41	57	53	49	46			0.8	0.8	CNS-15N	CNS-15N	14	15	1620	1620	6	6
4	18306	44509	SNMB3H-1	5	5	1498	1660	1638	1522	1551	1554	1557	1552			24	53	56	59	54			0.8	0.8	CNS-15N	CNS-15N	14	15	1620	1620	6	6
5	18307	44509	SNMB3H-1	5	5	1498	1638	1617	1512	1541	1543	1533	1528			14	43	45	35	30			0.8	0.8	CNS-15N	CNS-15N	12	15	1620	1620	6	6
6	18308	44509	SNMB3H-1	5	5	1498	1667	1640	1519	1556	1558	1560	1555			21	58	60	62	57			0.8	0.8	CNS-15N	CNS-15N	15	16	1620	1620	6	6
7	18309	44509	SNMB3H-1	5	5	1498	1634	1625	1523	1566	1560	1556	1554				25	67	62	58	56		1	1.6	CNS-15N	CNS-15N	15	16	1620	1620	6	6



## Lampiran 1.2 Spesifikasi Produk Mold Fluxes yang Digunakan

MOLD FLUXES SPESIFICATION												
Mold Fluxes	Tipe shape	Discosity (poise at 1300 °C)	Solidifying Temp ( °C)	T.C	SiO2	Al2O3	Fe2O3	CaO	Na	F	MgO	C/S
CNS-15N	Powder	2,2	1180	5,8	34,0	6,2	2,1	34,0	7,5	5,4	0,9	1,00

## Lampiran 1.3 Billet yang Mengalami Breakout



